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ELEMENTS

OF

MATERIA MEDICA,

CONTAINING

THE CHEMISTRY AND NATURAL HISTORY OF DRUGS;

THEIR

EFFECTS, DOSES, AND ADULTERATIONS

WITH THE

PREPARATIONS OF THE BRITISH PHARMACOPŒIAS.

BY

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The following work was undertaken with the object of affording the student in Materia Medica, a moderate sized book on this important subject, which would contain sufficient chemical and botanical information for the purposes of his examinations, and also a full account of the appearances and effects of medicines, their doses, adulterations, and the antidotes suitable for those that possess poisonous properties; all the pharmacopœial preparations are distinctly noticed, and the abbreviations, D. L. and E. are employed to designate the college (Dublin, London, or Edinburgh) by which they are directed; several formulas in addition are introduced into the work, and it includes notices of every new remedy of value; it is therefore hoped that it will also be suited to the wants of the dispenser, and as a work of reference for the medical practitioner.

The plan followed has been the natural history arrangement, which appears to have greater claims for adoption than any of those yet proposed, based on physiological views; and preceding the chemical and botanical parts of the work are some introductory remarks explanatory of the terms most commonly used in scientific descriptions.

MATERIA MEDICA.

PART I.

CHEMICAL INTRODUCTION.

Chemical substances are divided into mineral or inorganic, and into organic bodies; these latter are more complicated in structure than the inorganic, although consisting of fewer elementary parts. Inorganic bodies are subdivided into simple elements, and compounds of these with each other, their union occurring according to certain laws, thus they unite in "definite proportions," the quantity being limited on both sides, therefore, a substance such as water or salt, has always the same composition. Further, it has been found, that the quantity in which two substances unite, is the proportion in which their elements combine with other substances; this is named the law of "equivalent proportions," and from it arises the theory of atomic weights, or the calculated relative quantity in which bodies combine. Thus oxygen and hydrogen form water, in the proportions by weight of eight parts oxygen to one of hydrogen, which are their combining or atomic numbers. This law is best seen in the mutual decompositions occurring on mixing two salts; as on adding calomel to lime water, when a black precipitate falls of oxide of mercury, and chloride of calcium remains in solution.

137 parts of Calomel consist of	Chlorine, 36,	Calcium, 20	28 parts of Lime in Lime Water.
	Mercury, 101,	Oxygen, 8	
Uniting they form 109 parts of Oxide of Mercury	Oxygen, 8,	Calcium, 20	56 parts Chloride of Calcium.
	Mercury, 101,	Chlorine 36	

The third law, or that of "multiple combination," is seen when two elements unite to form more compounds than one; there is then a simple relation between the quantities in which one unites with the other in the different compounds. Thus nitrogen and oxygen unite to form five preparations, in which nitrogen is joined with 1, 2, 3, 4, or 5 atoms of oxygen; and soda unites with one atom of carbonic acid to form the carbonate or sal soda, and with two atoms of carbonic acid to form the bicarbonate or bread soda.

The elementary bodies yet known amount to 62; not above half of them are of importance in medicine. They are classed into non-metallic and metallic substances, and the latter into alkalies, alkaline earths, earths, and metals proper; for convenience, the first letter or syllable of their Latin names is used as an abbreviation or symbol to designate them in chemical writings, while figures as 1, 2, 3, are used to signify the number of atoms entering into the compound, for example, CO_2 means carbon with two parts of oxygen, or carbonic acid. When the figure is placed *before* a compound, it signifies so many quantities of the entire substance: thus, $2CO_2$ means two parts of carbonic acid. Subjoined is a list of the most important elementary bodies, with their symbols and combining number or atomic weight, according to the scale usually employed, in which hydrogen is the standard, and considered equal to 1. Another list of numbers is often used, in which oxygen is taken as the standard, and its weight considered equal to 100; for in all such scales an arbitrary quantity must be first assumed for one substance, and the others calculated from it, in proportion to the weight with which they combine.

NON-METALLIC ELEMENTS.

OXYGEN,	*Symbol,*	O.	*Atomic weight,*	8
HYDROGEN,	......	H.	......	1
NITROGEN,	......	N.	......	14
CHLORINE,	......	Cl.	.. ...	36
IODINE,	.. ...	I.	......	126
BROMINE	......	Br.	......	78
SULPHUR,	......	S.	......	16
PHOSPHORUS,	...	P.	......	32
CARBON,	......	C.	......	6
BORON,	......	Bo.	......	11
SILICON,	.....	Si.	......	22
FLUORINE,	......	Fl.	......	18

METALLIC ELEMENTS.

	ALKALIES.			
NATRIUM, (Sodium)	*Symbol,*	Na.	*Atomic weight,*	24
KALIUM (Potassium)	......	Ka.	.... .	39
	ALKALINE EARTHS.			
BARIUM,	......	Ba.	.... .	69
STRONTIUM	......	Sr.	......	44
CALCIUM,	......	Ca.	......	20
MAGNESIUM,	......	Mg.	......	12.7
	EARTHS.			
ALUMINUM,	......	Al.	......	13.7
	METALS.			
FERRUM, (Iron)	......	Fe.	.. ...	28
MANGANESE,	......	Mn.	......	28
ZINC,	......	Zn.	......	32
CUPRUM, (Copper,)	......	Cu.	......	32
STANNUM, (Tin)	......	Sn.	......	59
BISMUTH,	......	Bi.	......	71
ARSENIC,	......	As.	.....	75.3
PLATINUM,	......	Pt.	......	97
HYDRARGYRUM, (Mercury)	......	Hg.	......	101
PLUMBUM, (Lead)	......	Pb.	......	104
ARGENTUM, (Silver)	......	Ag.	......	108
STIBIUM, (Antimony)	.. ...	Sb.	......	129
AURUM, (Gold)	......	Au.	......	199

In uniting, the non-metallic and metallic bodies form various compounds; if these have acid properties, the name of the substance terminates in *ic*, as Nitr*ic*, or Sulphur*ic* acids; if there are more acids than one formed, the ending *ous* is used for that containing least of the non-metallic element, as Nitr*ous* and Sulphur*ous* acids.

When the resulting compound is not acid, and contains O, Cl, I, Br, or Fl, it is designated by the termination *ide*, as Ox*ide*, Chlor*ide*, Iod*ide*; if it contains S, C, N, Ph, or As, the termination *uret* is used as Sulph*uret*, Phosph*uret*, or Arsen*uret*. When more compounds than one are formed by the same elements, the terms *Proto*, *Bis*, *Ter*, are used to distinguish them; or *Sub* is applied to a compound with less of the non-metallic element than another, designated by *Per*; thus we have *Prot*oxides, *Sub*oxides, *Bin*oxides, and *Per*oxides. The term *Sesqui* (one and a half) is applied to substances intermediate in composition between protoxides and deutoxides, as *Sesqui*oxide of iron.

Bases are those substances, which uniting with acids, form the compounds termed salts; thus potash, a base, combining with nitric acid, forms the salt, nitrate of potash, or saltpetre. When the acid ends in *ic* the salt is designated by changing this to *ate*; thus, Sulphur*ic* acid forms Sulph*ates*, while the compounds of Sulphur*ous* acid are termed Sulph*ites*. When there is more acid than one part united with one of base, the excess is known by the Latin numerals, *Bis*, *Ter*, *&c.*, as the *Bis*ulphate of potash; if the base is in excess, the Greek terms, *Dis*, *Tris*, *&c.* are used, as *Tris*nitrate of bismuth; or the words *Bi or Tri* basic are employed.

Acids usually redden litmus paper, and taste sour, but their main character is forming salts with bases.

Water is frequently found in salts; when non-essential to their composition it is termed water of crystallization; in some instances it is intimately united, acting as a base, and is then called constitutional or basic water. Some salts exposed to the air absorb water, these are said to deliquesce; others loose water, and falling into powder, are termed efflorescent; permanent salts are those which undergo no change.

Analysis is the separation of a compound into its elements, as water into oxygen and hydrogen. Synthesis is again forming the compound from its elements.

Further remarks on these subjects appear unnecessary, as they are fully treated of in elementary works on chemistry; under each substance will be described its peculiar characters, tests, and other properties; and with alcohol, ether, cyanogen, ammonia, &c., will be found a succinct account of their relations in organic chemistry.

DRUGS

ARE WEIGHED IN PREPARING OR DISPENSING MEDICINES

BY TROY OR APOTHECARIES' WEIGHT,

IN ENGLAND AND SCOTLAND.

1 Pound	℔ j	equal to	12 Ounces or	5.760	Grains.
1 Ounce	℥ j	=	8 Drachms or	480	„
1 Drachm	ʒ j	=	3 Scruples or	60	„
1 Scruple	℈ j	=		20	„
1 Grain	gr. j				

IN IRELAND

THE FOLLOWING SCALE OF WEIGHTS IS DIRECTED TO BE USED,

TAKING AVOIRDUPOIS WEIGHT AS THE STANDARD.

1 Pound	℔ j	equal to	16 Ounces or	7.000	Grains.
1 Ounce	℥ j	=	8 Drachms or	437.5	„
1 Drachm	ʒ j	=	3 Scruples or	54.68	„
1 Scruple	℈ j	=		18.22	„

LIQUIDS

WERE FORMERLY WEIGHED;

THEY ARE NOW MEASURED BY THE IMPERIAL MEASURE.

1 Gallon	cong. j	equal to	8 Pints or	76.800	Minims.
1 Pint	O j	=	20 Fluid Ounces	9.600	„
1 Fluid Ounce	f ℥ j	=	8 Fluid Drachms	480	„
1 Fluid Drachm	f ʒ j	=		60	„
1 Minim	M j				

A Wine Glass full is about ℥ij. A Table Spoonful is ℥ss. A Dessert Spoonful is ʒij. A Tea Spoonful is ʒj.

OXYGEN. (*Symbol*, O. *Equivalent or Atomic Weight*, 8.)

Was discovered by Priestley in 1774. Lavoisier named it oxygen, supposing it the only generator of acids; it forms about three-fourths of our globe. Water contains eight-ninths its weight of oxygen, and the air 23 parts by weight in 100. It is a gas without odour or colour, of density 1.1, hence rather heavier than air, which is 1·0, incombustible, but powerfully supporting combustion; 100 volumes of water dissolve 3·5 of this gas; it combines with all elementary bodies except fluorine, forming oxides and acids; with potassium and sodium it forms alkalies. Oxygen combines slowly, as when metals tarnish in the air, and animal or vegetable substances decay; animal respiration is a slow form of combustion; it may also unite more rapidly, giving heat and light, as in ordinary burning.

Preparation.—Red oxide of mercury heated in a small retort separates into mercury and oxygen; the gas may be collected over water, HgO_2 forming Hg and 2O. Or chlorate of potash heated in a retort gives off nearly one cubic inch of oxygen for every grain of chlorate, and is then reduced to chloride of potassium. $KO,ClO_5 = KCl$ and 6O. By mixing about one-sixth of peroxide of manganese with it, less heat is necessary and the decomposition is more rapid; the manganese is not changed in the process. Or black oxide of manganese mixed with sulphuric acid to the thickness of cream, and heated in a retort, gives off oxygen $MnO_2 + SO_3 = MnO,SO_3$ and O, the peroxide being reduced to protoxide of manganese, and with the acid forming sulphate of manganese, which remains in the retort.

Oxygen relights a taper when blown out, if placed in the gas while the wick is glowing, and phosphorus burns in it with great brilliancy; if mixed with two volumes of hydrogen, and subjected to a galvanic shock, they unite explosively, forming water. Oxygen is not used medically; inhaling it was advised in cholera, phthysis, and asphyxia, but uselessly; breathing the pure gas is injurious to animals, and they become excited by it, then debilitated, and die after a time; diluted, as in the atmosphere, it is the source of animal heat, being absorbed by respiration, dissolved in the blood, and carried to the capillaries, where combining with the tissues, it evolves heat, forming carbonic acid, which escapes through the lungs.

HYDROGEN. (*Symbol,* H. *Eq. No.* 1.)

This gas forms one-ninth of water; it is the lightest body known, Density ·068, is without colour, and if pure, odourless; it burns with a pale blue flame, but is not a supporter of combustion, extinguishing a taper plunged into it; with oxygen it forms an explosive mixture, which, burned with proper precaution, produces the intense heat of the oxyhydrogen blowpipe. Hydrogen from its properties is considered to be a metal of a highly volatile character, but it has not yet been liquified; it exists abundantly in animal and vegetable substances, and in hydrochloric and hydrocyanic acids, &c. This gas can be respired for some time, if pure, without danger, it has the effect of changing the voice to a shrill squeaking tone.

Preparation—Hydrogen is got by decomposing water; this can be done with a galvanic battery, or by adding to water a metal, as zinc or iron in filings, with sulphuric acid; the oxygen of the water forms an oxide of the metal, which uniting with sulphuric acid becomes a sulphate, while the hydrogen escapes as a gas.

WATER. (*Symbol,* AQ. *Eq. No.* 9.)

Is composed of one part of hydrogen and eight of oxygen by weight, or taking these gases by volumes, of 2H to 1O. Its density when pure is taken as a standard for all liquids and solids; it is considered as 1 in Ph. L, or 1,000 in Ph. E. and D. At 32° of Fahrenheit's scale ice melts, and water boils at 212°, each cubic inch of water forming about one cubic foot of steam. Water is most dense at the temperature 39°, hence ice floats on water. Mr. Faraday has shewn that water in freezing becomes absolutely pure, all foreign matters, even gas being expelled; when pure water, free from air is heated, it does not boil below a temperature of 270°, then suddenly with explosive violence it becomes steam. Water combines with many substances forming *hydrates*, as with lime and potash. Sulphuric and nitric acids both require it in their composition, and some crystals as Epsom and Glauber salts contain much *water of crystallization*, which can be removed by drying them; others, as cream of tartar and phosphate of soda have it as an element of their composition, hence called *basic water*.

PURE WATER is procured by careful distillation; ORDINARY WATER, always has oxygen and carbonic acid gas dissolved in it, which are expelled by boiling; the water then tastes mawkish, its usual pleasant taste being due to the dissolved gasses.

RAIN WATER is soft, and contains some carbonate of ammonia, derived from decomposing animal substances and the smoke of cities, which the rain carries down in solution, it also contains gasses dissolved in it. SPRING and WELL WATER generally holds in solution bicarbonate and sulphate of lime, and chloride of sodium; when there is so much of the lime salts as to decompose and curdle soap, it is called HARD WATER; springs that are near cemetaries often abound in nitrates, and SPRING WATERS are frequently impregnated with other substances in large quantities, they are then called MINERAL WATERS, of which the chief varieties are—

ACIDULOUS OR CARBONATED.—Sparkling from carbonic acid, most of these waters also contain carbonate of soda; as

Bath..........	Warm.	Seltzers	Cold.
Weisbaden		Kissingen......	

SULPHUROUS.—Containing sulphuretted hydrogen, having the odour of rotten eggs and blackening the salts of lead and silver.

Bareges, in the Pyrennees	Warm.	Harrowgate	Cold.
		Lucan, near Dublin..	

CHALYBEATE.—Of an inky styptic taste; these contain iron in the state of carbonate, as Spa, Pyrmont, and Tunbridge. Boiling or exposure to air precipitates the iron in the form of brown sesquioxide; or the iron may be in the state of sulphate, when it is unchanged by boiling, as in several mineral springs.

SALINE.—Divided into

Purging Salines, containing sulphate of magnesia, as Epsom and Seidlitz, or sulphate of soda, as Cheltenham and Leamington.

Saline or Brine.—Holding in solution chloride of sodium, as Nantwich and Droitwich.

Calcareous.—Having sulphate or carbonate of lime, as Bath and Buxton.

Alkaline.—Containing soda, as Malvern, Ems, and Vichy.

The uses of mineral waters depend on the medicinal properties of their constituents. Common water has been proposed as a panacea, and is used externally and internally; it is no doubt rapidly absorbed and excreted through the kidneys and skin, and may be considered as an alterative, but its indiscriminate and excessive use in many diseases is highly dangerous. Externally, it is applied to wounds and ulcers as water dressing, by covering the part with lint dipped in water, and placing oiled silk over this. Infusions are usually made by digesting the bruised or sliced substance with boiling water, but cold water is employed in preparing the infusion of columba, D. The Ph. D. directs all infusions to be made by one hour's digestion. Decoctions are prepared by boiling the substance in water, and they should be strained while hot.

Aqua Destillata, D. L. E. *Distilled Water.*

Preparation.—L. Water cong x. first let Oij distil, throw this away, and distil cong viij.

E. Take any quantity of spring water, distil from a proper vessel, reject the first twentieth, and preserve the first half of the remainder.

D. Take spring or river water, having placed it in a copper still connected with a block tin worm or a Liebig's condenser, draw over about one-fortieth by distilling, reject this, and continue the process until about one-fifth of the water remains in the still; keep the distilled water in stoppered bottles.

It should be free "from colour and odour, unaltered by sulphuretted hydrogen, nitrate of silver, nitrate of barytes, or oxalate of ammonia, E." showing the absence of metallic impurities, chlorides, sulphates, or lime.

AZOTE OR NITROGEN. (N=14.)

Nitrogen was discovered in 1774 by Rutherford; it forms 77 parts in 100 of air, in which its chief use seems to be to dilutethe oxygen it contains; this elementary substance is found in most animal tissues, and abounds in many plants, as in the fungi and cruciferæ; all the vegetable alkaloids contain nitrogen in their composition. It is a gas, odourless, tasteless, not combustible, not soluble in water, and lighter than air, its density ·97; nitrogen can be respired, but is incapable of supporting life.

Preparation.—Nitrogen is procured by burning phosphorus in a jar of air confined over water. The oxygen forms phosphoric acid PO_5, soluble in water, and nitrogen remains comparatively pure.

AIR.

The atmosphere contains by weight 77 of nitrogen, and 23 of oxygen in 100 parts, with variable quantities of watery vapour, and from three to five of carbonic acid in 10,000 parts. It extends about 45 miles around the globe, becoming less dense as it is more distant from the earth, half its weight lying within three miles of the surface; its pressure at the level of the sea is nearly 15 pounds on every square inch, which is equal to a column of mercury of 30 inches, or one of water about 30 feet high; hence the barometer is used in measuring heights, a diminution of one inch in the column of mercury being equal to 922 feet of elevation; the temperature of the air also diminishes as we ascend, at the rate of one degree for every 352 feet. Man consumes in respiration the oxygen of nearly 720 cubic feet of air in 24 hours, forming carbonic acid, which escapes from his lungs into the atmosphere; three ounces of charcoal in burning would combine with the same quantity of oxygen. Plants in sunlight absorb carbonic acid from the atmosphere by their leaves, taking carbon into combination, and giving out oxygen, thus purifying the air of carbonic acid gas, which respiration and combustion are constantly producing. The density of air is taken as the standard for all gasses, it is 1.0.

Compounds of Nitrogen and Oxygen.

NO. Laughing gas, the protoxide of nitrogen, is prepared by heating nitrate of ammonia in a retort, it decomposes, forming water, and the gas, which is very soluble in cold water, must therefore be collected over warm water. Nitrate of ammonia $NH_3.NO_5=2NO$ and $3HO$. Laughing gas is colourless, almost inodorous, of a distinctly sweet taste, and when pure can be respired; it produces temporary intoxicating excitement in most persons. Dens. 1·52.

NO_2. Nitric oxide is made by acting on copper or mercury with nitric acid, a colourless gas forms, and can be collected over water; when mixed with air, this gas becomes red from uniting with oxygen. $4NO_5$ and $3Cu=3CuO,NO_5$ and NO_2; an atom NO_5 is decomposed giving $3O$ to the $3Cu$, and forming the gas NO_2; the $3CuO$ then unite with $3NO_5$, and form three parts of nitrate of copper.

NO_3. Hyponitrous acid is obtained when NO_2 is mixed with one-fourth its bulk of oxygen, it constitutes the red fumes produced on mixing NO_2 with air; this gas is condensed by a cold of 0° into a green liquid.

NO_4. Nitrous acid, formed by mixing NO_2 with half its bulk of oxygen. It is found in all coloured nitric acid, giving it a red, yellow, or blue tint, and can be obtained, when pure, as a colourless liquid.

NO_5. Nitric acid.

ACIDUM NITRICUM, D. L. E. ($NO_5=54$.)

Nitric Acid. Aquafortis.

Preparation.—L. Dried nitrate of potash and sulphuric acid of each ℔ij, mix in a glass retort, and distil the acid in a sand bath.

D. Take nitrate of potash ℔ij, nitrate of silver ʒij, or a sufficiency, boiling distilled water Ov. Dissolve the nitrate of silver in f℥ij of water, and the nitre in the rest of the water, add the former solution to the latter until a precipitate ceases to form, filter through calico, and evaporate the filtered liquid to dryness, put the residue in a retort whose neck passes at least five inches into a Liebig's condensing tube, then pour on it commercial oil of vitriol f℥xvij, and with a heat which towards the end of the process must liquify the contents of the retort, distil the nitric acid over.

E. Purify nitre, if necessary, by two or more crystallizings, till nitrate of silver does not precipitate its solution in distilled water; put in a glass retort equal parts of this purified salt and of sulphuric acid; distil into a cool receiver, with moderate heat, from a sand bath or gas flame as long as the fused materials give off vapor; the pale yellow acid thus obtained may be got colourless, if desired, by gently heating it in a retort.

In this process nitrate of potash is decomposed, two atoms of sulphuric acid combining with the potash to form a bisulphate of potash, which remains in the retort, the nitric acid set free combining with watery vapor, and condensing as liquid nitric acid. $2.KaO,NO_5$ and $4.SO_3HO$ forms $2\ (KaO,SO_3+HO,SO_3)$ and $2.NO_5HO$.

In commerce it is distilled in large quantities, nitrate of soda being used in place of nitrate of potash, as it requires less heat and less vitriol. In preparing it red fumes appear at the commencement of the process, from the NO_5 decomposing into NO_4 and O, for nitric acid cannot exist without water, and water is not vaporized then; in the end of the process the heat may rise so high as to decompose the acid, and again produce coloured fumes.

When pure it is a colourless fluid; but is often yellow or red from containing nitrous acid, Dens. about 1,500; it has a strong suffocating odour and intensely acid taste; in the air it fumes from attracting moisture; it does not exist in a free state, being always combined with water or some base.

TESTS—Nitric acid stains the skin yellow, this stain is made brighter by alkalies; with either morphine, brucine, or ordinary strychnine, it produces a bright red colour; indigo dissolved in sulphuric acid is decolourized by nitric acid; and copper or mercury heated with the acid, produces nitric oxide fumes, which absorbing oxygen from the air, become orange coloured.

ADULTERATIONS.—Generally slight and unimportant; but it should be of the density of 1,500 if it is of proper strength. The directions of D. are expensive, and will rarely be employed; its object is to separate the chlorides usually present in nitre, which can be as well accomplished by frequent crystallizings.

USES.—The strong acid is used as a caustic to phagedenic ulcers, hospital gangrene, warts, poisoned wounds, and sometimes to hœmorrhoids; it is applied on lint wrapped round a stick, and the part should be afterwards washed with a weak alkaline solution, or abundance of water, to prevent the acid acting too extensively. Internally it is given as a tonic, combined with bitters, in diseases of debility, and for urinary deposits of the oxalate of lime, or triple phosphates. With sarsaparilla it was much used in the treatment of secondary syphilis in broken down constitutions, or when complicated with scrofula; the iodide of potassium has nearly superseded it, but the acid is yet occasionally prescribed as a tonic. For chronic hepatitis it is given internally, and externally employed in baths, f℥j of the acid being added to each gallon of water for this purpose.

Strong nitric acid is a violent corrosive poison; it produces immediate symptoms, an acrid taste and intense burning pain in the mouth, throat and stomach, followed by vomiting of the contents of the stomach, mixed with blood and shreds of mucus changed by the action of the acid; from the same cause, the lips and inside of the mouth become yellow, and the tongue is swollen; the bowels are usually confined, and the abdomen feels painful and very tender; the surface of the body is cold, the pulse small and weak; death occurs in general within 24 hours, and on examination, the lining membrane of the esophagus and stomach is found chemically acted on, being softened and changed to a yellow or brown colour, in some parts green from bile, in others black from the effects of the nitric acid on the blood; the stomach also presents marks of inflammation, but is rarely found perforated in poisoning by this acid.

ANTIDOTES.—Weak alkaline solutions; chalk, or magnesia suspended in water; if these are not at hand, water, milk, or any mild diluent may be given in sufficient quantity

Acidum Nitricum Dilutum. D. L. E. *Dilute Nitric Acid.*

Preparation.—D. Pure nitric acid f℥iv. distilled water f℥xxix, mix. Dens. 1092.

L. Nitric acid f℥j. distilled water f℥ix, mix. Dens. 1080.

E. Pure nitric acid f℥j, or commercial acid of dens. 1390. f℥j and ʒv, mix with distilled water f℥ix. Dens. 1077.

Dose.—30 to 40 drops sufficiently diluted.

ACIDUM NITRO MURIATUM, D.

Nitro Muriatic Acid or Aqua Regia.

This is an intensely acid yellow fluid, smelling strongly of chlorine and nitrous acid; it is distinguished from the other mineral acids by dissolving gold and platinum.

Preparation.—D. Pure nitric acid f℥i, pure muriatic acid f℥ij. Mix in a green glass stoppered bottle, and keep in a cool place.

On mixing the acids chlorine is gradually evolved, saturating the solution, and colouring it of a deep yellow; the hydrogen of the muriatic acid at the same time removing oxygen from the nitric acid, produces nitrous acid fumes, NO_5 and HCl forming Cl.HO and NO_4; as chlorine escapes from the solution, fresh quantities of muriatic acid are decomposed, disengaging more chlorine in a concentrated form, and in bright sun light, or a warm room, the gas may be generated so rapidly as to break the bottle; hence the acid should be kept in small quantities, and before dispensing ought usually to be diluted with water.

TESTS.—Its composition is shown by nitrate of silver, which gives a white deposit of chloride of silver, and copper filings heated with the acid disengage orange coloured nitrous fumes.

USES.—The same as the acids of which it is composed. It is recommended as a bath in chronic hepatic affections, for this purpose f℥iv to vi of the acid are added to three gallons of water in a wooden tub; in this country it is employed as a foot bath, in India the entire body is immersed, or it may be sponged over with the solution.

DOSE.—Ten to fifteen drops properly diluted.

CHLORINE. (CL=36.)

Discovered by Scheele in 1774, and shown by Davy to be an elementary substance in 1809, it is found in abundance united with sodium, forming common salt.

Chlorine is a yellowish green gas, of suffocating pungent odour. Dens. 2·5. It is not combustible, but antimony and phosphorus take fire in it spontaneously, forming chlorides; and it inflames oil of turpentine, the hydrogen of which alone burns, the carbon of the turpentine being deposited as a smoky residue; under the pressure of four atmospheres, chlorine becomes a yellow liquid ; its most valuable property is that of bleaching vegetable colours, which Sir R. Kane considers it combines with, forming colourless compounds, and sometimes replacing their hydrogen ; the older opinion is that water is decomposed, the oxygen combining with the colour, and the hydrogen with chlorine, to form hydrochloric acid ; when quite dry chlorine has no action on litmus paper ; cold water absorbs about twice its volume of this gas.

Preparation.—Mix in a retort four parts of common salt with three parts of black oxide of manganese, and add seven parts of sulphuric acid diluted with seven parts of water ; the gas is evolved by gently heating, and may be collected over water. In this process the peroxide of manganese becomes protoxide, and gives oxygen to convert the sodium of salt into soda, which with sulphuric acid forms sulphate of soda ; the protoxide of manganese also unites with sulphuric acid and forms a sulphate, and chlorine is set free from the salt. MnO_2. $NaCl$ and $2SO_3$ produce MnO,SO_3. NaO,SO_3 and Cl.

TESTS.—Its odour, colour, and bleaching powers. In solution with nitrate of silver it forms a white curdy precipitate, which when melted becomes a grey horny mass ; light darkens the precipitate, converting it into a sub-chloride ; it is insoluble in nitric acid, and soluble in ammonia.

USES.—As a disinfectant chlorine is much used, for this purpose it was first extensively employed by Guyton Morveau ; it is generally procured by mixing chloride of lime in water, and exposing it to the air, or more rapidly by adding sulphuric acid to this mixture ; its deodorizing effects are supposed to depend on the same actions as those by which it bleaches.

In vapour, when largely diluted with air, it has been respired in phthysis ; its efficacy is doubtful, and it is liable to cause bronchial irritation. Chlorine is recommended as an antidote in poisoning with prussic acid or sulphuretted hydrogen ; it may be used by diffusing it in the air and producing artificial respiration.

Liquor Chlorinii, D. *Aqua Chlorinei*, E. *Chlorine Water.*

Preparation.—D. Introduce peroxide of manganese in fine powder ℥ss into a gas bottle, and pour on it commercial muriatic acid f℥iij mixed with water f℥ij ; gently heat, and by suitable tubes cause the evolved gas to bubble through water f℥ij placed in an intermediate small phial, and then to the bottom of an Oiij bottle holding distilled water Oj, the mouth of this bottle being loosely plugged with tow ; when the air has been quite displaced by chlorine, disconnect the bottle from the apparatus for generating the gas, cork it loosely, and shake until the chlorine is absorbed, then place the solution in a stoppered Oj bottle and keep it in a cool and dark place.

E. Triturate muriate of soda 60 grains, and red oxide of lead 350 grains, together; put them in water f℥viij contained in a stoppered glass bottle; add commercial sulphuric acid fʒij; agitate occasionally till the red oxide becomes almost white, and allow the insoluble matter to subside before using the liquid.

It forms a greenish yellow solution, with a strong odour of chlorine, and an acid styptic taste, containing about twice its bulk of the gas dissolved in water; by long keeping, or the action of light, it is decomposed, forming muriatic acid. The E. solution contains some sulphate of soda, and the lead used in the process falls as an insoluble sulphate. The preparation of D. is more troublesome, but gives a purer liquid.

Uses.—Concentrated it acts as a corrosive poison; diluted it has been used in typhus fever, in gargles for putrid sore throats, and as a lotion to fœtid ulcers.

Dose.—ʒss to ʒij diluted with ℥iv to viij of fluid, and as a lotion ʒj to ℥j of fluid.

IODINIUM, D. L. E. (I=126.) *Iodine.*

Iodine is an elementary substance, discovered by Courtois in 1811, crystallizing in soft scales of a greyish black colour, and with a metallic lustre like plumbago; of dens. 4·9. It has an acrid taste and an odour resembling chlorine; 7000 parts of water dissolve only one part of iodine, but it is more soluble in alcohol and ether. It fuses at 225°, boils at 347°, and forms a brilliant violet vapour, whence its name is derived. Iodine is found in brine springs and in sea water, from which the sea weed separates it in considerable quantity; the deep sea or drift weed contains more iodine than that growing near the shore; when burned it constitutes kelp, which is said to yield $\frac{1}{224}$ part of iodine. Nearly all the iodine used is made at Glasgow or in the north of Ireland.

Preparation.—Kelp is broken in pieces, and its salts dissolved by water; on evaporation the carbonate, chloride, and sulphate of soda crystallize, and when cooling, chloride of potassium is deposited; a dark liquid remains, containing iodine, probably combined with sodium. To this sulphuric acid is added, which expels carbonic and sulphurous acids, and sulphuretted hydrogen gasses; the fluid is then mixed with peroxide of manganese, and distilled in a leaden still, when iodine is evolved and collected in glass vessels.

In this process binoxide of manganese parts with one atom of oxygen, which oxidizes the sodium, forming soda. The protoxide of manganese and soda form sulphates, and the iodine set free, volatilizes.

NaI; MnO_2 and $2SO_3$ forms MnO,SO_3; NaO,SO_3, and I.

ADULTERATIONS.—Chiefly moisture; ℥j of iodine sometimes containing ʒj of water; it is detected by pressing with blotting paper which becomes damp; or "heat 39 grains of iodine, with 9 grains of quick-lime and f℥iij water, it forms a yellow or brown solution if the iodine is pure, but colourless if more than two per cent of water or other impurity is present, E." Coal, sand, and charcoal have occasionally been added as adulterations, they remain when iodine is evaporated with a gentle heat; the purity of iodine may be known by placing a given weight of it in water, and immersing in the mixture a piece of zinc, the weight of which is known, when after some days rest the fluid becomes clear, the zinc is again weighed, every grain it has lost is equal to four grains of pure iodine.

E. directs iodine to be dried by placing it in a shallow earthenware basin, in a confined space of air, with ten or twelve times its weight of quick-lime, which gradually absorbs the moisture.

Preparation.—IODINIUM PURUM, D.—Place commercial iodine in a deep circular porcelain capsule, cover this accurately with a glass matrass filled with cold water, apply a water heat to the capsule for 20 minutes, then let it cool; should the sublimate attached to the bottom of the matrass include white pungent acicular crystals, scrape them off with a glass rod, and reject them; replace the matrass, and apply a steady gentle heat (of a gas lamp,) so as to sublime all the iodine; upon lifting off the matrass, the product will be found attached to its bottom, separate it, and keep it in a stoppered glass bottle.

The water heat is directed to separate any iodide of carbon which may be present, and which sublimes in white crystals; afterwards a stronger heat is directed, to sublime the iodine from fixed impurities which it may contain. The product should be then dried in blotting paper to remove any water.

TESTS.—Heated, iodine evolves a violet vapour; with starch it forms a blue compound, the starch should be boiled and cool, as heat destroys the blue color, the iodine also must be free, hence its salts give no trace of iodine until a little nitric acid is added. The iodides give with solution of nitrate of silver a canary yellow deposit, and with acetate of lead, a yellow precipitate, soluble by heat, and falling again when the solution cools, in golden scales; with corrosive sublimate they produce a scarlet deposit, soluble in excess of iodide of potassium.

USES.—Iodine is chiefly used externally, its salts being employed for internal exhibition. In bronchocele or goitre it has been considered almost a specific, for this affection it is both applied locally, and taken internally; but Pereira states that he has often found it to fail; and he thinks many tumors in this part are confounded together, some of which are not curable by iodine. In scrofula, strumous diseases, and many secondary forms of syphilis, affecting the bones, skin, throat, or testicle, iodine is used with great advantage; it possesses undoubted powers as an alterative, and is most useful in aiding the absorption of enlarged glands, chronic abscesses, swellings of the joints, and tumors of many kinds; there are, indeed, but few chronic diseases for which it has not been employed.

An injection of three parts of water, and one of tincture of iodine, first recommended by Mr. Martin, of Bengal, is sometimes used for the radical cure of hydrocele, only ʒj or ij of the fluid need be injected for this purpose.

In large doses iodine is an irritant poison; its prolonged use is accused of causing absorption of the testes, and in females, of the breasts; emaciation is also attributed to its continued employment, or it may cause a disordered state termed iodism, with weakness, thirst, purging, fever, dry cough, and gradually death, if the iodine is not discontinued.

ANTIDOTES.—In poisoning with it, demulcents should be freely given, particularly starch and arrow root, which form a nearly inert blue iodide of starch.

DOSE.—It is rarely employed except in combination with iodide of potassium, from a quarter to half a grain may be given in this manner.

Tinctura Iodinei, E. *Tincture of Iodine.*

Preparation.—Iodine ℥iiss, rectified spirit Oij, dissolve.

Dose.—Gtt v to xxx diluted, objectionable for internal use, from depositing iodine by keeping, or when mixed with water.

Iodidum Amyli, Dr. Buchanan, *Iodide of Starch.*

Preparation.—Rub iodine gr. xxiv with a little water, and add powdered starch ℥j, dry with a gentle heat, and keep it in a closed bottle; dose ʒss gradually increased.

BROMINIUM, L. (BR=78.) *Bromine.*

Bromine is a elementary substance of dark reddish colour, when in small quantity of a hyacinth red: it is found in sea water, 100 pints of which yield about gr. iijss bromine; but is procured in larger amount from the ley or fluid remaining after crystallizing out the salts of several springs in Germany and America. It is very volatile, giving off ruddy vapours at ordinary temperatures, and boiling at 116°; it freezes at 4° into a leaden coloured crystalline solid. Antimony and arsenic take fire when dropped into it, and potassium explodes; bromine is slightly soluble in water, and much more so in ether, its odour is very disagreeable.

Preparation.—Bromine is got by passing chlorine through the solution, which sets bromine free and is separated by agitation with ether, which dissolves it. By potash it is then converted into bromide of potassium and bromate of potash. This is evaporated to dryness, and heated with binoxide of manganese and sulphuric acid in a retort; bromine passes over, and is condensed with cold water. The explanation of the process is similar to that of iodine.

TESTS.—With starch it forms an orange coloured compound. The bromides with solutions of acetate of lead or nitrate of silver give white precipitates.

Its effects are probably similar to iodine, but more active; one part may be dissolved in 40 parts of water, and given in doses of gtt v to vi properly diluted, three or four times daily.

HYDROCHLORIC ACID. (H,CL=37.)

Hydrochloric acid is a pungent, colourless gas, of acid taste, Dens. 1·26, becoming liquid, with a pressure of 40 atmospheres; in damp air it attracts moisture forming white fumes, and is so rapidly absorbed by water, that when a jar filled with this gas is placed in water, it rushes in as if to a vacuum. Water at 40° absorbs about 480 volumes of the gas, increasing in bulk about one-fifth, and forming liquid hydrochloric acid; the gas is irrespirable, and even when diluted with air is highly irritating; if dry it has no action on vegetable colours, but when moist it acts as a strong acid.

Preparation.—By heating liquid muriatic acid in a retort, the gas passes off in considerable quantity, and may be collected over mercury, or in a dry jar, from which it displaces the air by its greater density.

TESTS.—Its properties already described, and the formation of copious white fumes of muriate of ammonia, when a rod dipped in liquor ammonia is held near it.

USES.—A disinfecting agent, but much inferior to chlorine.

Acidum Muriaticum, D. E. *Acidum Hydrochloricum*, L.
Hydrochloric or Muriatic Acid.

Formerly called spirit of salt, when pure it is a colourless fluid, of the odour and taste of muriatic acid gas. It evolves acid fumes, and possesses the corrosive and acrid properties of the other mineral acids; in commerce it is usually straw coloured from impurities.

Preparation.—D. Dilute commercial oil of vitriol, f℥xxxxiv, with water f℥xxxij. When cool pour it on dried chloride of sodium ℔iij, previously placed in a globular flask, having a capacity of at least one gallon, gently heat, and conduct the muriatic acid gas as it escapes into a bottle containing distilled water, f℥xxxxiv, by means of a bent tube dipped about half an inch beneath its surface, and let the process continue till the product measures Oiij. Throughout the process, particularly towards its close, the heat of the water which absorbs the gas must, by applying external cold be prevented from rising. Dens. 1176.

L. Mix sulphuric acid f℥xx, with distilled water f℥xij, and add it to dried chloride of sodium ℔ij, put into a glass retort. Pour f℥xij of distilled water into a receiver, and the retort being fitted to it, let the acid distilled from a sand bath, pass over into this water, the heat being gradually increased. Dens. 1160.

E. Purify muriate of soda by solution in boiling water, concentrate the solution, and skim the crystals off as they form on the surface; drain them from the adhering solution, and wash them slightly with cold water. Take of this salt well dried, place it in a glass retort, and add an equal weight of pure sulphuric acid, diluted with one-third its weight of water, and allowed to cool; fit on a receiver containing two-thirds more of water, and distil with gentle heat by a sand bath, or naked gas flame, as long as any liquid passes over, keeping the receiver cool by snow, or a stream of cold water. Dens. 1170.

In this process water decomposes, its hydrogen uniting with chlorine of the salt, to form the muriatic acid which distils over; while the oxygen of the water forms soda with the sodium, and by sulphuric acid this is converted into a sulphate which remains in the retort. $NaCl$ and SO_3,HO. produce NaO,SO_3 and HCl.

TESTS.—It forms whites fumes, with a rod dipped in ammonia; and with nitrate of silver, gives a curdy white precipitate which is blackened by exposure to light, and soluble in ammonia.

IMPURITIES.—Being distilled in large quantities from iron vessels, in making soda from common salt, the commercial acid may contain iron, on saturating the acid with ammonia this would fall as red oxide of iron; sulphuric acid, if present, produces a white precipitate with chloride of barium, insoluble in acids; and chlorine or bromine are detected by the muriatic acid dissolving gold leaf, which is shewn by protochloride of tin, giving with it a purple precipitate.

USES.—A small quantity of muriatic acid is said to be always present in the stomach during digestion. When given in moderate repeated doses, well diluted, it acts as a tonic, and is used internally in bad forms of scarlatina; it is also of service in deposits of the triple phosphates, or of oxalate of lime; generally the vegetable tonics are combined with it. In gargles it may be used instead of sulphuric acid. Strong muriatic acid acts as a caustic; it is used to destroy the exudations of diphtherite; and applied to gangrenous and phagedenic sores, but is less employed for this purpose than nitric acid. When swallowed, it acts as a corrosive poison, causing symptoms very similar to the other concentrated acids; f℥j of it has destroyed life in 15 hours; after death the esophagus and stomach are found corroded and inflamed, in some parts being very dark, as if charred; in others, of a greenish yellow colour, from the action of this acid on the bile.

ANTIDOTES.—Magnesia; or soda in solution; or soap; with the abundant use of diluents.

Acidum Hydrochloricum Dilutum, L. *Acidum Muriaticum Dilutum*, D. E.
Dilute Muriatic Acid.

Preparation—L. E. Hydrochloric acid f℥iv, distilled water f℥xij. Dens. 1050.

D. Pure muriatic acid f℥iv, distilled water f℥xiij. Dens. 1045.

Dose.—Gtt xxx to xxxx properly diluted for internal use, or ʒj added to ℥viij of fluid for a gargle.

CARBON. (C=6.)

This substance exists under various forms; the diamond is pure carbon crystallized; coal, anthracite, and black lead, are varieties of carbon, and a large portion of the animal and vegetable tissues consist of it; with oxygen it forms carbonic acid, which is found united to lime as a carbonate in chalk, marble, and limestone; and combined with the metals, as for example iron and zinc, forming some of their most common ores; in the atmosphere, a vast amount of carbon is diffused as carbonic acid, every 10,000 parts containing three to five parts of this gas. The varieties of carbon used medically are graphite and charcoal.

Graphite, plumbago or black lead, consists of carbon, with some impurities, as silica and carburet of iron; it is chiefly procured at Borrowdale, in Cumberland. Internally, it has been used in doses of gr. x to ʒj, and an ointment applied externally of ʒj, or ij of graphite to lard ℥j, for chronic skin diseases; its medical effects are doubtful.

Carbo Ligni, D. L. E. *Wood Charcoal*, is black, without smell, tasteless, insoluble, and infusible; when burned, it combines with oxygen, forming carbonic acid, which causes the dangerous effects following its combustion in closed rooms. Charcoal is remarkable for absorbing odourous and colouring matters from solutions with which it is mixed, it also has the property of condensing gasses into its pores, and often in far greater quantity than its own bulk; thus one cubic inch of box wood charcoal can take up

90 times its volume of ammoniacal gas,
65 ——————— sulphurous acid,
55 ——————— sulphuretted hydrogen,
35 ——————— carbonic acid.

When the charcoal is freshly prepared these effects are most evident; lately attention has been called to charcoal made from peat or turf, as a disinfectant for sewers and night soil; having the power of condensing both the fœtid odours and the valuable ammoniacal products of decaying substances, it will thus, no doubt, be useful, and far preferable to any of the other substances as yet recommended for these purposes, but its capability of destroying contagion are very dubious.

Preparation.—Charcoal is made by imperfectly burning billets of wood in heaps, covered with turf and sand, allowing only enough of air to enter to consume the oxygen, hydrogen, and nitrogen of the wood; its carbonaceous residue forming the charcoal; that used for preparing gunpowder is obtained by distilling wood in iron vessels, as in making pyroligneous acid; willow, dogwood, and alder, when burnt, make the best kinds of charcoal.

USES.—Pulverized it is employed for tooth powder; areca or betel nut charcoal is preferred for this purpose, being harder, and therefore considered better suited to remove incrustations from the teeth, but generally common charcoal is substituted for it. In poultices, charcoal is applied to fœtid, gangrenous, and phagedenic ulcers, to absorb their offensive odour. Internally, it has been used in dysentery with the same intention, and in Sicily it has been employed as a remedy for ague. Dose.—gr. x to ʒj frequently administered.

Charcoal Poultice.—Is made by adding to the linseed meal poultice one-fourth its weight of recently burned charcoal, in powder.

Carbo Animalis. L. E. D. *Animal Charcoal, or Ivory Black,* is prepared in the manufacture of sal ammoniac, by burning bones in closed vessels as long as vapours are given off; the residue constitutes ivory black. In 100 parts it contains about 10 of carbon, 88 of phosphate and carbonate of lime, and two of salts of iron. It is more useful for decolorizing liquids than wood charcoal, probably from the minute division of its particles; hence it is employed to decolorize the vegetable acids and alkaloids; but as these liquids often contain free acids, the phosphate and carbonate of lime must be first removed, as in the

Carbo Animalis Purificatus, D. L. E. *Purified Animal Charcoal.*

Preparation.—D. To ivory black ℔v. add commercial muriatic acid Oiij, diluted with water Oiij; digest, repeatedly stirring, with a gentle heat, for 24 hours; add a gallon of water, agitate well, let the insoluble parts subside, and decant or remove by a syphon the clear liquid; do this three times, then place the black sediment on calico and wash it with distilled water, until the washings cease to precipitate with nitrate of silver; then in a stove or oven dry the product, at first gently, finally at a heat from 300° to 400°.

L. Take water f℥xij, muriatic acid f℥xij, mix and add gradually to animal charcoal ℔j, digest for two days, with a gentle heat, often shaking; pour off the fluid, and wash all the acid from the charcoal by water, then dry it.

E. The same quantities as L. After digesting two days, boil it, diluted with water Oij; collect the charcoal on a filter of linen or calico, and wash till what passes through, scarcely precipitates with carbonate of soda, then heat the charcoal, at first moderately, then to redness, in a covered crucible.

In this process, hydrochloric acid dissolves the phosphate, and decomposes the carbonate of lime and sulphuret of calcium, disengaging carbonic and hydrosulphuric acid, and forming soluble chloride of calcium, which is washed out, the minutely divided charcoal remaining. "If pure, when incinerated with its own volume of red oxide of mercury, it is dissipated, leaving only a scanty ash." E.

CARBONIC ACID. (CO_2=22.)

This is a colourless gas, of dens. 1·5; hence heavier than air; of an agreeable pungent taste and odour; not combustible nor supporting combustion; potassium alone, when heated in it, burns, forming carbon and carbonate of potash. At 32° under a pressure of 36 atmospheres it becomes liquid; when the pressure is removed, part of the fluid substance escaping into gas, causes such intense cold as to freeze the rest into a white solid. A solution of solid carbonic acid in ether, when evaporating, produces the most intense cold known, – 180° F. Carbonic acid is found in caverns, old wells, and vaults, and acting as a narcotic poison, may cause dangerous accidents; it is also disengaged during fermentation, and may collect in the vats of breweries, whenever a candle is extinguished in such places, the gas has accumulated to a dangerous extent, and life has often been lost by descending into it. In mines, from its poisonous effects, it is called choke damp. Water absorbs about its own bulk of carbonic acid, and under pressure dissolves much more, which escaping when the pressure is removed, forms effervescing waters. Ordinary soda water consists only of carbonic acid condensed into water; genuine soda water, and solution of magnesia, contain these alkaline substances as well, which enables the water to hold more of the gas in solution; carrara water consists of carbonate of lime, dissolved in water by carbonic acid; and all effervescing mixtures owe their agreeable taste to this gas escaping from a carbonate, as soda or potash, by the addition of some acid; generally either citric or tartaric acid is employed for this purpose.

Preparation.—On adding sulphuric or muriatic acid to chalk, the gas is evolved. CaO,CO_2 and HCl, form HO. $CaCl$, and CO_2.

The hydrogen of the muriatic acid uniting with oxygen of the lime, forms water; the calcium of the lime unites with chlorine, forming chloride of calcium, and carbonic acid escapes.

USES.—The cataplasma fermenti is a local application to ulcers of this gas, arising from a yeast poultice. Internally, carbonic acid is employed in effervescing waters and mixtures as a tonic; it checks vomiting, and allays irritability of stomach. The effervescing draught, made with bicarbonate of potash and lemon juice, forms one of the most pleasant modes of using it; but bicarbonate of soda and tartaric acid are oftener employed.

TABLE OF SATURATION OF ACIDS AND ALKALIES FOR EFFERVESCING MIXTURES.

20 Grains of	Require of Lemon Juice.	Or Citric Acid.	Or Tartaric Acid.
Carbonate of Soda ..	ʒiiss	gr. 10	gr. 11
Bicarbonate „ ..	ʒiv	„ 17	„ 18
Carbonate of Potash ..	ʒiv	„ 17	„ 18
Bicarbonate „ ..	ʒiiiss	„ 14	„ 15
Carbonate of Ammonia.	ʒvi	„ 24	„ 26
Carbonate of Magnesia.	ʒvi	„ 25	„ 27

Pure carbonic acid is irrespirable, causing spasm of the glottis, and speedy death; when diluted the gas can be respired, but is still dangerous, producing death by non-æration of the blood in the lungs, and the circulation of venous blood through the arteries, which reaching the brain, gives rise to giddiness, insensibility, and convulsive movements; when ten per cent of carbonic acid is mixed with air, it is sufficient to prove fatal; the respirations of many persons in a small room, as in the black-hole of Calcutta, or burning charcoal or coke may cause this accumulation, and death in hanging, drowning, and suffocation, although sometimes caused by violent injuries, is generally due to poisoning with carbonic acid, generated in the sufferers own circulating fluid; the symptoms being analogous to those caused by breathing diluted carbonic acid, and the same treatment necessary, in all those class of accidents, to restore animation.

ANTIDOTES.—Removal into pure air and the production of artificial respiration, to replace the impure gas in the lungs, by fresh air, fit for animal life; warmth and friction should also be used, and usually on recovery moderate venesection is necessary to prevent secondary engorgements of the brain or lungs.

TESTS.—Carbonic acid is distinguished by being odourless, and extinguishing flame, it renders lime water milky, forming a white deposit of carbonate of lime.

BORON. (BO=11.)

This elementary substance was discovered by Davy to be the base of boracic acid; it is a dull olive coloured powder, without taste or smell; when heated to 600° it takes fire, oxidizes, and forms boracic acid, which is procured in Tuscany, issuing with steam from fissures in the ground; basins are dug round these apertures, and filled with water, the vapour passing through them deposits its boracic acid in the water, the fluid is then evaporated, and crystals procured, which are afterwards combined with soda to form borax.

Boracic acid, BoO_3 is procured by dissolving borax in four parts of water and adding sulphuric acid, which forms soluble sulphate of soda, and pearly scales of boracic acid.

TESTS.—An alcoholic solution of boracic acid produces, when burned, a green flame.

USES.—Boracic acid is nearly inert; it is used to increase the solubility of cream of tartar; seven parts of this with one of boracic acid forming a soluble cream of tartar.

PHOSPHORUS. (PH=32.)

Phosphorus was discovered in urine by Brandt, in 1669. It is found in bone and nerve tissue, and in small quantity in the vegetable and mineral kingdoms. This substance is a soft, flexible, wax like solid, brittle in cold weather, colourless or yellowish, luminous, and giving off white fumes of a garlic odour; when exposed to the air it is very inflammable, and must therefore be kept under water. Friction or slight heat causes phosphorus to burst into brilliant flame, and form dense white fumes of phosphoric acid. It melts at 108° F., and boils at 550° forming a colourless vapour. Phosphorus is soluble in alcohol, ether, and the fixed and volatile oils.

Preparation.—Bone ash, which consists chiefly of sub-phosphate of lime, is mixed with half its weight of sulphuric acid, diluted with water; an insoluble sulphate, and soluble super-phosphate of lime form; the latter is dissolved in water; the solution is evaporated, mixed with about one-fourth its weight of charcoal, and strongly heated in an earthen retort, when phosphorus distils over and is condensed in water. It is purified by remelting and straining through chamois leather, and finally moulded with glass tubes into sticks for sale.

EFFECTS.—Phosphorus, when formed into a paste with fat, is used in Germany to poison rats, and is much employed to make one description of lucifer match. Medically it has been used as a stimulant and aphrodisiac; it is dangerous from its great inflammability, and should never be given in a solid state; indeed there is little evidence that it has any medical effect whatever; some assert that phosphoric acid is produced from it in the stomach, and causes the dangerous symptoms; but even in a concentrated state this acid is not corrosive.

In poisoning with phosphorus the symptoms appear to be those of a violent irritant, operating with uncertainty; sometimes not commencing for hours after taking it, and generally death does not ensue before some days have passed.

ANTIDOTES.—Taylor states that oil and melted butter are injurious, as they would dissolve the poison; but this appears no objection to them, if afterwards free vomiting is employed, which oil or butter is likely to produce; perhaps mixing some turpentine with the oil would be advantageous, as its vapour prevents phosphorus inflaming; the employment of magnesia and mucilaginous drinks are advised.

DOSE.—The Prussian pharmacopœia directs phosphorus gr. iv to be dissolved in almond oil f℥i, and gtt v to x to be given, mixed in mucilage. Small doses of phosphorus as gr. ij or iij have proved fatal.

Acidum Phosphoricum Dilutum, L. (PO_5.) *Phosphoric Acid.*

Phosphorus and oxygen form many compounds fully described in chemical works; the chief of these are phosphorous acid, PO_3, formed by the slow combustion of phosphorus; and phosphoric acid, which is employed medically, when diluted with water; it is prepared by the following process:—

Preparation.—L. Mix nitric acid f℥iv, with water f℥x in a retort, placed on a sand bath, and add phosphorus ℥j; apply heat until f℥viij distil over; replace this in the retort, and again distil f℥viij which are to be rejected. Evaporate the remaining liquid in a platinum capsule to f℥ij ʒvj. When this becomes cold, add enough distilled water to make up f℥xxviij.

In this process three atoms of phosphorus take fifteen atoms of oxygen, forming $3PO_5$, and converting the nitric acid into nitric oxide gas, which escapes. $3P$ and $5NO_5$ forming $3PO_5$ and $5NO_2$ Dilute nitric acid is used to avoid explosions, and combustion of the phosphorus, which a stronger acid would be likely to cause.

Pure phosphoric acid is in masses like ice; it is very acid, reddening litmus paper, and forming salts with the alkalies and metals. The dilute phosphoric acid is a colourless fluid, of dens. 1064, and containing about 10·5 per cent. of the pure acid; 42 grains of carbonate of soda should saturate 100 grains of it.

ADULTERATIONS.—The purity of the dilute acid is shewn by whatever chloride of barium or nitrate of silver precipitates, being re-dissolved with nitric acid, denoting the absence of sulphates or chlorides; copper or silver strips are not acted on by it, unless it is adulterated with nitric acid; and it should not be coloured by hydrosulphuric acid, showing the absence of metals.

USES.—It is tonic, like other mineral acids, and when largely diluted it has been employed in the treatment of diabetes; its power of dissolving phosphate of lime has led to its use in phosphatic urinary deposits, in ossification of arteries and exostosis.

DOSE.—Gtt x to ʒj of the dilute acid in sufficient fluid.

SULPHUR, E. SULPHUR SUBLIMATUM, L. D.

(S=16.)

This elementary substance is found in a native or uncombined state, forming beds, along with gypsum and rock salt; the volcanic districts of Sicily and Italy abound with it, and yield most of the sulphur used in Europe; in combination with various metals, as copper, lead, and mercury, it forms their commonest ores, called pyrites; in mineral waters it is obtained in the state of sulphuretted hydrogen; and many plants contain sulphur, as garlic, mustard, and assafœtida; it also exists in some animal substances, such as albumen, urine, &c. Native sulphur is purified by heating it in an iron still, the vapour as it sublimes is conducted into a large room, and on cooling, falls in minute crystals, like a fine powder; or the sulphur may be cooled in a small receiver and solidified into masses, which, when remelted, and cast in wooden moulds constitutes cane brimstone; the dark impure residue remaining in the still, is sold as sulphur vivum, or horse brimstone; sulphur is also got by heating iron pyrites, some of the sulphur burns, the rest is vaporized, and condensed in the manner described, this is generally contaminated with arsenic, and seldom used except in making oil of vitriol.

Sulphur is a brittle, crystalline, pale yellow solid, by friction becoming highly electric, when ignited, it burns with a pale blue flame, forming sulphurous acid SO_2, it is soluble in oils, and turpentine; sulphur melts at 230° into a thin fluid, at 340° it becomes viscid, and if heated to 450°, and thrown into water, it remains viscid, and can be drawn into threads; when further heated it again melts into a fluid, and boils about 600°. Sulphur is dimorphous, or capable of crystallizing in two distinct shapes; thus when obtained from solutions it forms right prismatic octohedrons, and by fusion it is procured in oblique rhombic prisms.

IMPURITIES.—Crude native sulphur contains different earthy substances, and if sublimed from iron pyrites, orpiment, the sulphuret of arsenic may adulterate it; sulphur dissolves in oil of turpentine, leaving any of these impurities; by washing sulphur with water, and testing with litmus paper, the presence of any acid is shown by the paper becoming red.

USES.—Externally it is applied in ointment for scabies, or itch, which some consider it has a special action on; others suppose that it has a poisonous effect on a parasite, originally described in Dr. Meade's work, and more lately by Raspail, as the cause of this disease; this little animal belongs to the class *Arachnida*, and is named the *Sarcoptes Hominis*, but there are said to be fewer insects than itch pustules; oil of bergamot may be added to conceal the odour of the sulphur ointment, and a little cinnabar changes its colour, which is sometimes objectionable; other skin diseases, such as psoriasis and lepra, are occasionally treated with sulphur. Administered internally, it acts as a laxative, and is mild and certain in its effects; it is prescribed in the form of electuary, for which a form is given by D., and is generally used for hœmorrhoids, stricture, prolapse, and other affections of the rectum, and in chronic skin diseases; sulphur produces solid evacuations, Dr. Paris therefore considers it acts especially on the muscular coat of the bowels; but bile, the natural purgative, contains much sulphur, and its effects are probably due to increasing or improving this secretion.

DOSE.—ʒj to iij as a laxative.

Unguentum Sulphuris, D. L. E. *Sulphur Ointment.*

Preparation.—L. Sulphur ℥iij, lard ℔ss, oil of bergamot, min xx, mix. D. E. Sulphur ℔j. lard ℔iv, mix.

Unguentum Sulphuris Compositum, L. *Compound Sulphur Ointment.*

Preparation.—Sulphur ℔ss, powdered white hellebore ℥ij, nitrate of potash ʒj, soft soap ℔ss, lard ℔iss, oil of bergamot, min xxx, mix.

This is considered more effectual, but is more irritating than the former ointment.

Confectio Sulphuris, D. *Sulphur Electuary.*

Preparation.—Sublimed sulphur ℥ij, bitartrate of potash ℥j, clarified honey ℥j, by weight; syrup of ginger f℥ss, syrup of saffron f℥ss, mix.

Dose.—From a tea spoonful to a table spoonful every night and morning, jalap may be added to the electuary, if required to be more purgative.

The syrup of saffron is added with the intention of changing the colour of the sulphur, which is disagreeable to some persons.

ACIDUM SULPHURICUM, D. L. E. (SO_3=40.)

Sulphuric Acid or Oil of Vitriol.

Sulphuric acid is a dense oily looking liquid, colourless when pure, and odourless, but highly acid and corrosive, charring animal and vegetable tissues from its affinity for water, which it abstracts from the tissues, leaving carbonized products ; if exposed to the air, sulphuric acid absorbs watery vapour, and its bulk increases about one-third in twenty-four hours ; when mixed with water it evolves considerable heat, four parts of acid and one of water producing a temperature of 300° ; its dens. is 1846 ; it freezes at – 15°, and boils at 620°. The sulphuric acid of commerce is a hydrate, being composed of SO_3HO. An acid is prepared by strongly heating dried sulphate of iron in earthen retorts, at Nordhausen, in Saxony ; vapours distil over and are condensed into a dark oily looking corrosive fluid, which fumes in the air, and red oxide of iron is left in the retort ; this acid contains about one equivalent of water to two of sulphuric acid, or $2SO_3,HO$; its dens. is 1·9 ; when it is heated it separates into ordinary sulphuric acid, which remains in the vessel, and anhydrous sulphuric acid, which volatilizes, and can be condensed in fine white silky crystals, resembling asbestos, and having no acid properties, unless water is present, it melts at 66° and boils at 122° ; when thrown into water this anhydrous acid hisses like hot iron.

Preparation.—By burning sulphur, sulphurous acid gas is formed, and then conveyed by a wide chimney into a large leaden chamber, having water on its floor to the depth of a few inches; steam and fumes of nitrous acid, produced by heating nitre and sulphuric acid, are also introduced; the nitrous acid parts with oxygen, converting the sulphurous into sulphuric acid, and becoming itself changed into nitric oxide, which absorbs oxygen from the air of the chamber, to part with it in the same manner, and change fresh quantities of sulphurous gas into sulphuric acid. In practice, more complicated reactions occur; sulphurous and nitrous acids do not act on each other when dry, but if watery vapour be present they form a white crystalline compound, the composition of which is not clearly known; this falling into water is decomposed into vitriol, which remains in solution, and nitrous fumes which escape. The water in the chamber is allowed to absorb sulphuric acid until it is of dens. 1·5, then concentrated in leaden pans to dens. 1·7, or until it begins to dissolve the lead; after this its further evaporation must be carried on in glass or platinum vessels, until it is dense enough for sale.

Acidum Sulphuricum Purum, D. E. *Pure Vitriol.*

Preparation.—D. Place commercial vitriol in a small plain retort, with a few slips of platinum foil, and with a Florence flask as a receiver, distil by a small charcoal fire or gas lamp one-tenth of the acid, reject this, and using a fresh receiver, again distil until not more than f℥j remains in the retort. Keep the acid in a stoppered bottle; its dens. is 1846.

E. If the commercial acid contains nitrous acid, heat f℥viij of it with gr. x to xv of sugar, at a temperature not sufficient to boil the acid, until the dark colour at first caused shall nearly or altogether disappear. Other impurities are removed by distilling, which, on a small scale, is managed by boiling the acid with a few platinum chips in a glass retort, with a sand bath or gas flame, rejecting the first half ounce. Dens. 1845.

IMPURITIES.—Organic matter, as straw or cork, falling into the acid become charred, and often render it dark coloured; sulphuric acid may contain sulphate of lead, dissolved from the vessels it is made in; on diluting the acid this impurity falls as a white powder, which is blackened by sulphuretted hydrogen; the presence of any nitrous acid is detected by protosulphate of iron forming a dark solution with the vitriol which contains it; but the most important adulteration is arsenic, which is often present in vitriol made from the iron pyrites, now much used to procure a cheap sulphur. They are roasted, and the sulphur escaping as sulphurous acid is conducted into the lead chambers, as in the ordinary process; unfortunately, being much contaminated with arsenic, the product is very impure; to separate this, as far as possible, the sulphurous acid is passed, before entering the leaden chamber, through long tubes, in which it cools and deposits much of its arsenious acid; to detect it, dilute the acid and apply the usual tests for arsenic; as much as gr. iss of it has been found in f℥j of vitriol.

TESTS.—Sulphuric acid gives, with solution of acetate of lead, a white precipitate of sulphate of lead; and with chloride of barium, a white deposit of sulphate of barytes, insoluble in acids; when mixed with charcoal and strongly heated, this becomes sulphuret of barium, which placed on paper, moistened with sugar of lead, and muriatic acid added to it, produces a black stain on the paper. When sulphuric acid is heated with copper or mercury it is decomposed, disengaging sulphurous fumes.

EFFECTS.—Taken in a diluted state, sulphuric acid is used to check excessive sweating, and for hœmorrhages of the lungs, uterus, or stomach; it is added to mixtures to promote the solubility of quinine and to disguise the flavour of Epsom salts, and in combination with bitters, employed as a tonic, in recovery from acute diseases; it enters into the infusion of roses, and is frequently added to gargles; largely diluted with water, it is advised as a drink for workmen employed in lead manufactories to prevent attacks of lead colic.

The strong acid is used as a caustic to the bites of rabid animals, and in entropion is applied by a narrow slip of wood to the eyelids, to cause a cicatrix, which contracting, may evert the lid. This concentrated acid, when swallowed, acts as a corrosive poison; by coagulating albumen and extracting water from the tissues, and by carbonizing the parts it touches, it causes destruction in the mucous surface of the mouth and stomach; the sufferer has excruciating pain in the throat and abdomen, vomiting of acid fluids, often mixed with blood, a difficulty of swallowing from the poison affecting the upper part of the larynx, great exhaustion, cold clammy skin, thirst, and a feeble pulse, the mind remaining generally unaffected, and death occurring suddenly, in 18 to 24 hours after taking the poison. The matters first vomited will effervesce if thrown on limestone, and from the vitriol in them will produce brown moist stains on cloth, in which the acid may be detected long after by examination. Upon death, the inside of the stomach is found dark brown or black, it usually contains a tarry fluid consisting of altered blood and mucus, and is often perforated by an irregular opening, through which the acid escaping into the peritoneal cavity, may act on the intestines, and even on the coats of the aorta; if life is prolonged for some hours, marks of inflammation are perceptible around these corrosions; sometimes the person survives, sloughs detach from the throat and stomach, and the injured parts cicatrize, but they may afterwards contract and form strictures, from the effects of which the patient may ultimately die of starvation or exhaustion. Sulphuric acid is so corrosive that ʒj or ij has destroyed life, when taken with the stomach empty.

ANTIDOTES.—Any diluent should be given in sufficient quantity to dilute the poison, and magnesia, chalk, or soap, mixed with water, may be employed to neutralize it. The introduction of the stomach pump would be likely to do harm, and must be avoided.

Acidum Sulphuricum Dilutum, D. L. E. *Dilute Sulphuric Acid.*

Preparation.—D. E. Pure sulphuric acid f℥j, distilled water f℥xiij; mix. Dens. D. 1084, E. 1090.

L. Sulphuric acid f℥iss, distilled water f℥xivss; mix. Dens. 1110.

Dose.—Gtt x to xxx well diluted. The L. preparation is much stronger than the others, fʒj of it saturates twenty-eight grains of carbonate of soda. The object of D. in the forms for dilute mineral acids, is to obtain them of the same chemically neutralizing power, not of the same degree of acidity in taste.

Acidum Sulphuricum Aromaticum, D. E. *Aromatic Sulphuric Acid, or Elixir of Vitriol.*

Preparation.—D. Place rectified spirit Oiss in a stoppered bottle, gradually add pure sulphuric acid f℥iiiss; mix, and add ginger bruised ℥j, cinnamon bruised ℥iss, macerate for one week, occasionally shaking, then filter, and keep in a stoppered bottle. Dens. 974.

E. Uses the same proportions; gradually add the acid to the spirit, and digest with gentle heat for three days in a closed vessel; add the aromatics, digest for six days, and filter; or moisten them with some of the acid liquid, and after twelve hours put them in a percolator, and transmit the rest of the acid spirit.

Sulphovinic acid is formed in this preparation, but most of the sulphuric acid exists in an uncombined state. Its effects are similar to the dilute sulphuric acid.

Dose.—Gtt xx to ʒj in a glass of water.

SULPHUR IODATUM, D. ($S_2I=158$.)

Iodide of Sulphur.

Preparation.—Triturate pure iodine in powder ℥j, sublimed sulphur ʒij, in a mortar; put the powder in a Florence flask, and heat gently till they fuse; when cool, break the flask, and immediately enclose the product in well stoppered bottles.

This is a black crystalline compound, having a strong odour of iodine, and an acrid taste; it stains the skin yellow; if exposed to the air, iodine rapidly escapes from it; an ointment of iodide of sulphur has been used in obstinate skin diseases, such as lupus, acne, herpes, and lepra, containing gr. x to xxx of this substance mixed with lard ℥j. It is not employed internally.

SULPHURETTED HYDROGEN. ($HS=17$.)

This fœtid gas is colourless and inflammable; its odour resembles rotten eggs, which owe their smell to this gas; if respired, it is very poisonous, causing, when in a concentrated state, narcotic symptoms, and even when largely diluted, it still continues dangerous, producing nausea, head-ache, delirium, and convulsions; it is generated in sewers from rotting animal matter, and dissolved in water, forms sulphurous springs, such as Harrowgate, and Lucan, near Dublin; its source in these springs, is probably decomposing sulphuret of iron contained in the earth.

Preparation.—By adding dilute sulphuric acid to sulphuret of iron, or of antimony, this gas is formed; thus:—FeS and SO_3HO, produce FeO,SO_3 and HS. In this process water is decomposed, its hydrogen uniting with sulphur of the sulphuret of iron to form the gas; its oxygen combining with the iron, forms an oxide of iron, which, with sulphuric acid, becomes protosulphate of iron, and remains in solution.

TESTS.—The fœtid odour of the gas distinguishes it; when in solution, sulphuretted hydrogen blackens silver and its salts, as when a silver spoon is placed in it; with solution of acetate of lead, it also gives a black precipitate.

USES.—It is much employed in chemistry, as a test for metals; in solution, as in Harrowgate water, it is administered with occasional benefit in chronic skin diseases, amenorrhœa, chlorosis, chronic rheumatism, and gout; in inflammatory affections it is considered injurious; its efficacy appears rather over rated.

ANTIDOTES.—When insensibility is caused by inhaling this gas in sewers, the person should be removed to fresh air, and stimulants used, with cold affusion; as chlorine decomposes sulphuretted hydrogen, it may be respired, largely diluted with air, in these accidents.

Artificial Harrowgate water may be made of chloride of sodium ℥j, sulphate of magnesia ℥iss, sulphuret of potash ʒiss, boiling water f℥xviij.

Dose.—A wine glassful taken in a cup of warm water.

AMMONIÆ HYDROSULPHURETUM, D.

Hydrosulphuret of Ammonia.

Preparation.—Place sulphuret of iron ℥iss, water f℥xv, in a two-necked bottle; add commercial oil of vitriol f℥iss, by degrees, through a safety funnel, and conduct the sulphuretted hydrogen, which is disengaged, by suitable tubes, first through distilled water f℥ij, placed in a small intermediate phial, and then to the bottom of a bottle containing solution of ammonia f℥iv, the neck of this bottle, through which the tube passes, being loosely plugged with tow; if, when the development of gas ceases, a drop of the ammoniacal liquid added to a saturated solution of sulphate of magnesia gives no precipitate, the preparation is complete; but should a precipitate occur, the solution contains free ammonia, and must again be subjected to the action of sulphuretted hydrogen. It should be kept in a stoppered green glass bottle. Dens. 999.

This preparation is employed in testing metallic solutions, and was formerly used as an internal remedy, but is not now prescribed for this purpose. Decomposing animal substances evolve both hydrosulphuret of ammonia and sulphuretted hydrogen; it causes the same dangerous symptoms when inhaled as this gas, and poisoning by it requires similar treatment.

SODIUM OR NATRIUM. ($NA=24.$)

This metal, the base of soda, was discovered by Davy; it is of silver white colour, of waxy consistence, and lighter than water, its dens. being ·97; when exposed to air it absorbs oxygen, forming soda; hence it must be preserved in naphtha. If thrown on water it decomposes this fluid, disengaging hydrogen with a hissing noise, and taking oxygen, but not inflaming, unless the water is hot, or the globule of sodium is prevented from moving about. The oxide soda, NaO, can be procured by evaporating a caustic solution of soda to dryness. It is not used medically.

TESTS.—All soda salts are distinguished by negative tests; they do not precipitate with sulphuretted hydrogen, as the ordinary metals; with carbonate of soda, as the alkaline earths; or with chloride of platinum, as the other alkalies, potash and ammonia. Dissolved in alcohol, they burn with a yellow flame. Soda gives an insoluble white precipitate with solution of the antimoniate of potash.

SODII CHLORIDUM, D. L. SODÆ MURIAS, D. E. (NA CL=60.) *Common Salt.*

This important substance is found extensively diffused through the world; thus it forms vast deposits of rock salt, as in England, at Cheshire; and in Spain and Poland; it abounds in many springs, as in Stafford and Worcestershire, termed brine springs, from the salt they contain; and sea water affords about two and a half per cent of common salt, mixed with other saline constituents, such as sulphate and chloride of magnesia; salt is also found in plants growing near the sea shore, and in the animal fluids, blood, urine, &c.

Preparation.—Impure rocksalt is dissolved (or the brine is obtained from springs) and evaporated in large shallow pans; the impurities are separated by skimming, and salt crystallized in different sized crystals; the large salt used for preserving fish is made by slow crystallizing, and finer table salt by more rapid evaporation.

Sometimes in France and other places, sea water is evaporated by the suns heat in shallow basins near the shore; common salt crystallizes out as the water evaporates, and sulphate of magnesia remains dissolved in the liquid with the other salts of sea water.

Sodæ Murias Purum, E. *Pure Salt.*

Preparation.—Dissolve any quantity of salt in boiling water; filter the solution, boil it down over the fire, skimming off the crystals which form, wash them quickly with cold water and dry them.

Common salt, if pure, is not deliquescent, but from containing some chloride of magnesia it generally attracts moisture. One part of salt dissolves in two parts and a half of water, and is nearly equally soluble at all temperatures; it does not dissolve in pure alcohol; salt crystallizes in cubes, and sometimes in hollow four-sided pyramids; if heated, it decrepitates, and at a red heat fuses and sublimes unchanged. It is neutral to test paper.

PURITY.—E. "A solution of pure salt is not precipitated by solutions of carbonate of ammonia, followed by phosphate of soda; nine grains of salt dissolved in distilled water is not entirely precipitated by twenty-six grains of nitrate of silver." The solution of ammonia would detect the presence of lime, and with the phosphate of soda would test any adulteration from a salt of magnesia.

USES.—In our food salt appears indispensable, as the blood always contains it in its composition; sea scurvy has been attributed to its excessive use, but is rather due to the want of vegetables; over salted meat is, however, innutritious and indigestible. One or two table spoonfuls of salt dissolved in warm water form a speedy emetic; useful in narcotic poisoning from the readiness with which it can be obtained, and in poisoning with nitrate of silver the salt acts as a chemical antidote. Dissolved in enema, salt is used as a remedy for ascarides, and it has been taken in large doses by persons affected with worms. As a substitute for sea water baths, a solution of ℔j rock salt may be added to every three gallons of water in the bath. If taken in excessive quantity, common salt may act as an irritant poison; a pound of it taken at once has caused death.

DOSE.—ʒss to ʒj; as an emetic ℥j to ij; in enemas ℥ss to ℥iss.

SODÆ CHLORINATÆ LIQUOR, D. L.

Solution of Chlorinated Soda.

This solution is sold as Labarraque's soda disinfecting liquid; it is a pale yellowish fluid, with the odour of chlorine, and having an astringent taste; it reacts alkaline, and then bleaches test paper; if exposed to air it absorbs carbonic acid, evolving chlorine gas; its composition is uncertain, it is said to contain an hypochlorite of soda.

Preparation.—D. Blend well in a mortar, chlorinated lime ℔ss with water Oiij; put the mixture in a stoppered bottle, and shake it frequently during three hours; then filter through calico, and to the clear solution add crystallized carbonate of soda ℥vij dissolved in water Oj; stir well for ten minutes; separate the liquid by a second filtration, and keep it in a stoppered bottle. Dens. 1034.

L. Put chloride of sodium ℥iv, binoxide of manganese ℥iij, rubbed to powder into a retort, and add sulphuric acid ℥iv, mixed with water f℥iij; heat the retort, and pass the chlorine disengaged through water f℥v, and then through carbonate of soda ℔j dissolved in water Oij.

USES.—It is employed as a disinfecting agent, for which it is preferable to chloride of lime; the latter is, however, more used, being cheaper. Internally, chloride of soda is administered, when diluted, to check fœtid expectoration, in gangrene of the lungs, and in malignant scarlatina, &c. It is also applied, as a wash, to putrefactive and fœtid discharges, and to syphilitic, cancerous, and other foul ulcers; besides removing the offensive odour, its antiseptic powers are useful in checking diseased action; it may be applied on lint or sprinkled on poultices.

DOSE.—Internally, gtt xx to xxx in ℥ij of fluid; for lotions ℥j, diluted with ℥ij to xij of water.

SODÆ SULPHAS, D. L. E. ($NaO. SO_3+10$ AQ.)

Sulphate of Soda.

Sulphate of soda, or Glauber's salt, is found in many mineral waters, as Leamington and Cheltenham, and also in some minerals; it forms long, transparent, colourless, oblique rhombic crystals, of a cool, bitter, and saline taste; exposed to air they effloresce, falling into powder; a variety has been got crystallized in octohedra, free from water of crystallization. Glauber's salt dissolves in three parts of water at 60°.

Preparation.—L. Dissolve the salt which remains after distilling hydrochloric acid ℔ij in boiling water Oij; add gradually sufficient carbonate of soda to neutralize the acid; boil down until a pellicle appears, and set aside the strained solution to crystallize; pour off the liquor and dry the crystals.

E. Take the salt remaining after making pure muriatic acid ℔ij, dissolve it in boiling water Oiij; add white marble in powder as long as effervescence takes place; boil, and when neutral, filter the solution; wash the insoluble matter with boiling water; add the water to the original liquid; concentrate till a pellicle begins to form; then let the liquid cool and crystallize.

L. Directs soda to be used, and E. marble, to neutralize the excess of acid usually present in the residue after distilling muriatic acid; but the salt is always bought from manufacturers who decompose chloride of sodium with vitriol, as the first part of the process for making carbonate of soda, which is now the chief use of Glauber's salt.

TESTS.—It is known to be a sulphate by forming a white precipitate with chloride of barium.

EFFECTS.—A saline cathartic, acting like sulphate of magnesia, but less used from its disagreeable taste; this is very much concealed by adding to it a few drops of dilute sulphuric acid.

DOSE.—ʒj to ℥j in solution.

Cheltenham salts are artificially prepared, by dissolving sulphate of soda ℔viij, carbonate of soda ℔ij, in boiling water, one gallon; filtering and evaporating until crystals form.

Dose.—ʒj to iv in solution, every morning or every second morning.

SODÆ PHOSPHAS, D. L. E. ($2NaO.HO+PO_5+24$ AQ.)

Phosphate of Soda.

This is also named tribasic phosphate of soda, or tasteless purging salt; it crystallizes in large oblique rhombic prisms, which are transparent and colourless; they effloresce in the air, and have a cool saline taste; it is dissolved by four parts of cold or two of boiling water; the solution is slightly alkaline. This salt is insoluble in alcohol.

Preparation.—D. Take ox bones, burned white in a clear fire, and in fine powder, ℔x; place them in a large earthen or lead dish, and pour on them oil of vitriol f℥ 56; mix well with a glass rod; after twenty-four hours add gradually, with constant stirring, one gallon of distilled water, and digest forty-eight hours, adding occasionally water to supply any loss from evaporation; add now a second gallon of water; agitate well; digest for another hour; throw all on a calico filter, and when the liquid ceases to trickle through, wash the precipitate frequently with boiling distilled water, until the washings very slightly redden litmus. Concentrate the filtered fluid and washings to one gallon, and after twenty-four hours filter it; to the filtered solution heated to 212°, add carbonate of soda ℔xij, or a sufficiency, until the mixture is slightly alkaline; then filter it through calico; the clear fluid passing through, will when concentrated till a film begins to form on its surface, give on cooling, crystals of phosphate of soda; from the mother liquid more crystals may be got by further concentration; dry the salt on blotting paper, and keep in stoppered bottles.

E. Mix bone ashes ℔x, sulphuric acid Oij ℥iv, and gradually add water Ovj; digest three days, replacing the water that evaporates; add boiling water Ovj; strain through linen, and wash the mass on the filter with boiling water, till it comes through nearly tasteless; let the impurities subside, and concentrate the clear fluid to Ovj; again let impurities settle; pour off the clear liquid; heat to boiling, and add carbonate of soda, dissolved in boiling water, till the acid is neutralized; let the solution cool and crystallize; more crystals may be got by again evaporating, adding a little carbonate of soda till the liquid is feebly alkaline to red litmus paper, and letting it cool.

L. In the list of materia medica, to be bought prepared.

By adding sulphuric acid and bone ashes together, an insoluble sulphate, and a soluble super-phosphate of lime form; the latter is washed out, the solution is concentrated, and on adding carbonate of soda is converted into sub-phosphate of lime, which precipitates, and phosphate of soda which remains in solution, and is crystallized by evaporating; the carbonic acid of the carbonate of soda escapes as a gas with effervescence.

Tests.—With solutions of acetate of lead, and of chloride of barium, phosphate of soda gives white precipitates; and with nitrate of silver a yellow precipitate. If the phosphate of soda is strongly heated it looses its water, and forms bibasic phosphate of soda, which with nitrate of silver produces a white precipitate; there is also a glassy monobasic phosphate of soda formed by adding phosphoric acid to the ordinary phosphate of soda, and strongly heating; it gives a white pasty deposit with the nitrate of silver.

If to a solution of phosphate of soda, a salt of magnesia is added, and then ammonia, an insoluble white deposit is produced, the ammoniaco-magnesian, or triple phosphate, which sometimes forms calculi in the bladder, and constitutes one variety of white or phosphatic urinary deposit.

Purity.—This salt is usually free from adulteration; the precipitate it forms with barytes, or nitrate of silver, should dissolve in nitric acid; "forty-five grains of it dissolved in boiling distilled water f℥ij, and precipitated by fifty grains of carbonate of lead in pyroligneous acid f℥j, will still precipitate with solution of acetate of lead." E.

Uses.—A mild saline purgative, valuable from having only a slight taste; it is easily taken in weak broth by omitting the common salt, and is useful in dysentery when a mild purgative is required; it may be given with benefit in urinary deposits of lithic acid in small doses much diluted.

Dose.—ʒiv to ℥iss as a purgative; gr xx to xxx for lithic deposits.

Solutio Sodæ Phosphatis, E. *Solution of Phosphate of Soda.*

Preparation.—Phosphate of soda in crystals 175 grains, distilled water f℥viij.

This solution is used as a test for magnesia.

SODÆ BIBORAS, D. L. SODÆ BORAS, E.
($NaO,2BO_3+10$ Aq.) *Borax.*

The biborate of soda, or borax, is supposed to have been known to the ancients; it is found in some lakes in Tibet and Persia, and is imported through India under the name of tincal; it is also made by saturating boracic acid, obtained from Tuscany, with soda. Borax crystallizes in large colourless prisms, devoid of odour, and having a somewhat alkaline and saline taste; it dissolves in twelve parts of cold or two of boiling water; in dry air borax effloresces slightly, and if heated loses its water of crystallization, forming calcined borax; at a red heat it is fused into a transparent glassy mass; it can also be obtained crystallized in octohedrons, which are permanent in the air, and contain only five atoms of water. Borax is not subject to adulteration.

TESTS.—By adding sulphuric acid to a concentrated solution of borax, crystals of boracic acid will be deposited as the mixture cools; these crystals burned with spirit of wine produce a green colored flame.

USES.—Mixed with honey, or in gargles, borax is employed for the aphthæ of children, and in ulceration of the mouth; it is stated by some to promote uterine action, and is therefore given in solution or mixed with ergot of rye for amenorrhæa, and retention of the placenta, or inaction of the uterus after delivery. The solubility of lithic acid in borax has led to its employment in this urinary deposit. Dr. G. Bird considers that care is necessary when using it with females, from its stimulating effects on the uterus, but further evidence is yet required of its possessing these powers. Bouchardat prefers the borate of potash as a remedy for lithic acid, and directs bitartrate of potash gr. xvij, borax gr. xv, bicarbonate of soda gr. xv, to be taken well diluted with water, and frequently, whilst effervescing; if it purges, the quantity may be diminished.

DOSE.—ʒss to ʒj. For gargles ʒj may be dissolved in ℥viij of fluid.

Mel Boracis, D. L. E. *Honey of Borax.*

Preparation.—Borax powdered ʒj, clarified honey ℥j; mix. Used for aphthous affections of children, or added to gargles.

SODÆ CARBONAS, D. L. E. $(\mathrm{NaO,CO_2+10\ Aq.})$

Subcarbonate, or Carbonate of Soda.

This substance, also known as sal or washing soda, is obtained by various processes; by burning plants growing near the sea shore, which produce barilla, and from sea weeds, the ashes of which constitute kelp; but at present its chief source is the decomposition of other soda salts, which is extensively carried on in large manufactories.

Kelp is procured from the larger fuci, or drift weed, dried and burned in kilns, twenty-four tons of sea weed producing about one ton of kelp. This process employed many thousands of persons some years since on the coast of Ireland and Scotland; its consumption is now very much decreased, and it is made less for the sake of the soda, than to extract the iodine it contains. Kelp is in hard, dark grey or blueish masses, of an alkaline taste, yielding from four to eight per cent of carbonate of soda.

Barilla is the ash of plants growing near the shore; they are mostly of the order *Chenipodiaceæ* and the genera *Salsola* and *Salicornia;* they are burned on the shores of the Mediterranean, the Canary islands, and the East Indies. Barilla is in hard, grey masses, and contains twenty-five to forty per cent of carbonate of soda, mixed with common salt, potash salts, and other impurities; its importation into these countries has nearly ceased. *Common Salt* is the source of almost all the carbonate of soda now made; it is converted into sulphate of soda by heating it with an equal weight of sulphuric acid of dens. 1·600; the chlorine of the salt escapes as hydrochloric acid gas, and the fused product remaining, can be dissolved in water, crystallized, and sold as Glauber's salt; or it may be powdered and mixed with an equal quantity of chalk, and half its weight of small coal; this is strongly heated in a reverberatory furnace, and stirred at intervals; it fuses into a black mass, which when cold is dissolved in water, the solution is evaporated to dryness, and calcined with some saw dust, the residue then forms British barilla, which contains from twenty to forty per cent of carbonate of soda, mixed with sulphate of soda and common salt.

By heating sulphate of soda with coal, carbonic acid is formed and passes off, a sulphuret of sodium remaining, NaO,SO_3 and $2C$ forming NaS and $2CO_2$; the carbonate of lime then decomposes the sulphuret of sodium, forming carbonate of soda and sulphuret of calcium, NaS and CaO,CO_2 producing NaO,CO_2 and CaS; by washing with water the carbonate of soda is dissolved out, leaving sulphuret of calcium mixed with any undecomposed coal, on evaporating the solution a saline mass is obtained; as this contains some caustic soda and sulphuret of sodium, it is mixed with saw dust, again strongly heated, to convert all into carbonate of soda, and on solution and crystallizing, large crystals of this salt form.

Carbonate of soda is in transparent crystals, forming oblique rhombic prisms, or in irregular shaped masses; exposed to the air, it effloresces, falling into a white powder, and at a red heat looses all its water of crystallization. It is inodorous, but has a disagreeable alkaline taste ; it dissolves in two parts of water at 60°, forming a strongly alkaline solution.

TESTS.—On the addition of an acid to the salt, the escape of carbonic acid gas shows it to be a carbonate ; it is distinguished from the bicarbonate of soda by giving a brick red deposit with corrosive sublimate.

IMPURITIES.—Carbonate of soda usually contains abundance of sulphates and chlorides ; these are known by dissolving it in water and neutralizing with nitric acid, then adding chloride of barium and nitrate of silver to separate portions of the solution ; both cause white precipitates, insoluble in acids.

USES.—It is not much employed as its taste is disagreeable ; the dried carbonate of soda is used as an alterative for children, and to neutralize acidity of the stomach ; soda may act as a poison, if taken in quantity, as when the caustic fluid used to make soap is swallowed, it causes an acrid alkaline taste in the mouth, and burning heat, extending to the epigastrium ; sometimes there is vomiting, the ejected fluid being mixed with blood changed to a dark brown colour by the soda ; there is also diarrhœa and symptoms of exhaustion similar to those produced by any corrosive poison ; after death, the stomach is found inflamed, softened, eroded, and sometimes of a black colour in patches ; these accidents are of rare occurrence.

Sodæ Carbonas, L. *Purified Carbonate of Soda.*

Preparation.—Take impure carbonate of soda ℔ij, distilled water Oiv ; dissolve by boiling, strain while hot, and set it aside to crystallize.

Sodæ Carbonas Siccatum, D. E. *Sodæ Carbonas Exsiccata*, L.
Dried Carbonate of Soda.

Preparation.—Heat carbonate of soda in a porcelain capsule until it is dried ; then powder it.

Fifty-three grains are equal to 143 of the crystallized carbonate of soda ; it requires to be heated to redness, that its strength may be uniform.

Dose.—Gr. v to xx in powder or pills.

Liquor Sodæ Carbonatis, D. *Solution of Carbonate of Soda.*

Preparation.—Dissolve crystallized commercial carbonate of soda ʒiss in distilled water Oj. Dens. 1026.

This is a useless solution, rarely required, and which may always be made extemporaneously.

Dose.—ʒss.

SODÆ SESQUICARBONAS. ($2NaO,3CO_2.+4Aq.$)

Sesquicarbonate of Soda.

It occurs native on the banks of some African lakes, and is exported under the name of trona; it is also formed when bicarbonate of soda is dissolved in boiling water. This salt is not used medically.

SODÆ BICARBONAS, D. E. SODÆ SESQUICARBONAS, L. ($NaO,2CO_2+2Aq.$) *Bicarbonate of Soda.*

The bicarbonate of soda is found in many mineral waters, as in those of Vichy; it is sold as a fine white powder, of slighly alkaline taste and reaction; soluble in thirteen parts of cold water; when dissolved in boiling water it loses one-fourth of its carbonic acid, and becomes a sesquicarbonate; if strongly heated it parts with its water and half its carbonic acid, forming dried carbonate of soda.

Preparation.—D. Dissolve crystals of carbonate of soda ℔ij, in distilled water Oij; and having diluted commercial muriatic acid Oiss, with water Oiij, add it to chalk in fragment ℔j, or a sufficiency; manipulate with the apparatus in the manner described for bicarbonate of potash; it is not necessary to filter the mother liquid before evaporation, when obtaining an additional quantity of bicarbonate.

L. Dissolve carbonate of soda ℔vij, in distilled water cong. j; pass carbonic acid, made from muriatic acid and marble, through the liquid to saturation; let the salt subside, press it in folds of linen, and dry with a gentle heat.

E. Fill with marble fragments a glass jar, open at the bottom and tubulated at the top; close the bottom so as to keep in the marble without preventing the free passage of a fluid; connect the tubulature with an empty bottle by a bent tube and corks, and this in like manner with another bottle, filled with one part of carbonate of soda and two parts of dried carbonate of soda, well mixed together, and let the tube be long enough to reach the bottom of the bottle; before closing the last cork closely, immerse the jar to the top in diluted muriatic acid contained in any convenient vessel; when the whole apparatus is thus filled with carbonic acid gas, secure the last cork tightly, and let the action go on till next morning, or till the salt no longer absorbs gas; remove the damp salt formed, and dry it in the air without heat, or at a temperature not above 120°.

Bicarbonate of soda is made extensively by wholesale manufacturers according to the above processes, or by exposing crystals of carbonate of soda to an atmosphere of carbonic acid gas, until sufficient of it is absorbed.

IMPURITIES.—Probably no substance used medically is more adulterated; as commonly sold it is a mere mixture of Glauber's salt, common salt, and a small portion of genuine bicarbonate of soda; one ounce taken from an average specimen gave me 80 grains of sulphate of soda and 104 grains of common salt; the purest bicarbonate is that sold as Howard's soda, but I have not found it quite pure.

TESTS.—Carbonic acid is detected by the escape of the odourless gas, on adding an acid to bicarbonate of soda; it is distinguished from the carbonate of soda by "a solution in forty parts of water not giving an orange precipitate with corrosive sublimate." E.

USES.—It is employed as an antacid to correct over acidity of the stomach; for this purpose it should not be taken immediately before, or for an hour after eating, as acid is necessary during the process of digestion; and when urinary deposits of the lithates exist, potash is preferable as an alkali; the salts of soda and lithic acid being much more insoluble than those formed with potash. In phosphatic deposits all alkaline preparations should usually be avoided, and Dr. Prout particularly prohibited the use of effervescing saline draughts in these affections; in feverish attacks these draughts are employed to allay thirst, to check nausea, and cause slight diaphoresis. Twenty grains of bicarbonate of soda take eighteen grains of tartaric acid, or seventeen grains of citric acid, or ʒiv of lemon juice, to saturate it in forming an effervescing draught.

DOSE.—Gr. x to ʒj.

Pulveres Effervescentes Citrati, D. *Effervescing Powders with Citric Acid.*

Preparation.—Take citric acid crystals ʒix; bicarbonate of soda ʒxj, or bicarbonate of potash ʒxiij; powder the acid and alkaline bicarbonate separately, and divide each into eighteen parts; keep the acid and alkali in different coloured papers.

Pulveres Effervescentes Tartarizati, D. *Effervescing Powders with Tartaric Acid.*

Preparation.—Take tartaric acid crystals ʒx; bicarbonate of soda ʒxj, or bicarbonate of potash ʒxiij; powder the acid and alkali separately, and divide each into eighteen parts; keep them in different coloured papers.

In prescribing these powders, in addition to the pharmacopœial name, the alkali should be denoted; they contain in each powder about

27 grains citric acid, or } with { 33 grains bicarbonate of soda, or
30 grains tartaric acid, } with { 39 grains bicarbonate of potash.

The alkali is dissolved in a tumbler full of water, and the acid then added to the draught, which is taken whilst effervescing; the addition of syrup of orange peel ʒiv, and one drop of oil of lemon, improves its flavour.

Pulveres Effervescentes, E. *Effervescing Powders.*

Preparation.—Tartaric acid ℥j, bicarbonate of soda ℥j and gr. liv, or bicarbonate of potash ℥j and gr. clx; powder the acid and alkaline bicarbonate separately, and divide each into sixteen parts; preserve them in papers of different colours.

Ginger Beer Powders.—Contain twenty-five grains of tartaric acid, in a white paper, and thirty grains of bicarbonate of soda, white sugar ʒj, ginger five grains, and one drop of oil of lemon, mixed in a blue paper.

Seidlitz Powders.—Rochelle salt ʒiss, bicarbonate of soda ʒss, in a blue paper, and tartaric acid gr. xxv, in a white paper.

A saline aperient, taken effervescing in water; sometimes an additional ʒj of Rochelle salt is added to increase its effect.

Liquor Sodæ Effervescens, L. E. *Soda Water.*

Preparation.—Bicarbonate of soda ʒj, distilled water Oj; dissolve, and saturate with carbonic acid, under strong pressure; preserve the liquid in well closed vessels.

It is used by many as an habitual drink, but the continued use of alkalies cannot be serviceable; the preparation might well be omitted, as the manufacture of soda water is a distinct business; common soda water often contains no soda, being only a solution of carbonic acid in water.

Trochisci Sodæ Bicarbonatis, E. *Soda Lozenges.*

Preparation.—Bicarbonate of soda ℥j, pure sugar ℥iij, gum arabic ℥ss; pulverize them, and with mucilage beat into a mass for making lozenges. Used in acidity of the stomach.

SODÆ CAUSTICÆ LIQUOR, D.

Solution of Caustic Soda.

Preparation.—Dissolve crystals of commercial carbonate of soda ℔ij, in distilled water cong. j; heat to boiling in a clean iron vessel; gradually mix with it fresh burned lime ℥x, slaked with distilled water ℥vij, and boil for ten minutes, constantly stirring; remove the vessel from the fire, and when the insoluble parts subside, and the fluid is quite clear, transfer it by a syphon to a stoppered green glass bottle.

Dose and Effects.—Similar to liquor potassæ. Its dens. is 1056. From ʒss to ʒij may be given diluted with ℥ij of fluid.

SODÆ ET POTASSÆ TARTRAS, D. E. SODÆ POTASSIO-TARTRAS, L. ($NaO,Tart.KaO,Tart+8Aq.$)

Tartrate of Soda and Potash.

This is also called Rochelle salt, and sal de Seignette, as it was first prepared in Rochelle by Seignette, an apothecary; it is usually in a fine white powder, of mild saline taste, and rather bitter; but it may be obtained in large transparent crystals, which effloresce slightly in dry air; these often crystallize in halves, and are soluble in two parts of cold, or in less of boiling water.

Preparation.—D. Dissolve crystals of commercial carbonate of soda ℥ix, in distilled water cong. ss; to the solution, while boiling hot, gradually add bitartrate of potash in powder ℥xij, or enough to form a neutral solution, then filter, evaporate till a pellicle forms on its surface, and set it to crystallize; after twelve hours, decant the solution from the crystals, dry them on blotting paper, and keep in a bottle; by further concentrating and cooling, more crystals may be got.

L. E. Dissolve carbonate of soda ℥xij, in boiling water Oiv, gradually add bitartrate of potash ℥xvj, or to neutralization; evaporate the solution till a pellicle forms, and let it crystallize; remove and dry the crystals, and evaporate the liquid again to get more.

The excess of tartaric acid of the cream of tartar combines with the soda, expelling its carbonic acid, and forming the double salt.

NaO,CO_2 and $KaO,2tart.$ form $NaO,tart. + KaO,tart,$ and CO_2.

TESTS.—Bichloride of platinum shows it contains potash, by producing with it a yellow precipitate; the nitrate of silver gives a white deposit of tartrate of silver, soluble in excess of water; and by heat the salt is decomposed, disengaging the odour of burning sugar or caramel from the tartaric acid, leaving a residue of potash and soda.

USES.—A mild saline aperient, much employed in the form of Seidlitz powders, and sometimes added to tonic bitter infusions, as gentian, columba, and quassia; in small doses it is beneficial in lithic acid deposits, as when absorbed it decomposes and passes out of the system, forming the carbonates of potash and of soda.

DOSE.—As a purgative ʒiss to iv, in solution; for lithic acid ʒss to ʒj.

SODÆ ACETAS, D. L. (NaO, Acet.+ 6 Aq.)

Acetate of Soda.

If pure, the acetate of soda forms colourless and transparent oblique rhombic prisms, or is often in white foliated masses; it should be neutral to test paper, and unlike the acetate of potash, not deliquescent; in dry air, the crystals loosing their water, diminish nearly one-third in weight, and effloresce; its taste is saline, and slightly bitter; it is soluble in three parts of cold, or in its own weight of boiling water; when heated the salt fuses, and at a red heat is converted into carbon and carbonate of soda.

Preparation.—D. Place commercial acetic acid, dens. 1044, Oj, in a porcelain capsule; gradually add crystals of carbonate of soda ℔j, or a sufficiency, taking care there shall be slight excess of acid; evaporate the solution till a pellicle forms, and crystallize; drain the crystals from the mother liquid, and dry them by short exposure to air, on a porous brick; keep them in a stoppered bottle.

L. Contained in the materia medica; to be bought prepared.

ADULTERATIONS.—If it contain any sulphates, they may be detected by nitrate of barytes, and chlorides by nitrate of silver, giving white precipitates; insoluble in water and acids. Potash is present if the salt deliquesces, bichloride of platinum produces with this a yellow precipitate.

TESTS.—Sulphuric acid added to acetate of soda disengages an acetic odour, and strong heat converts it into carbonate of soda, which, mixed with alcohol and ignited, produces a yellow flame.

USES.—It is largely made by saturating impure pyroligneous acid with chalk or lime, an acetate of lime forms, which is decomposed by sulphate of soda, the acetate of soda in solution, is removed from the insoluble and useless sulphate of lime, and the solution evaporated gives impure crystals, which when purified by re-crystallizing, are used to make acetic acid. In medicine it is rarely employed, its action is diuretic, similar to acetate of potash.

DOSE.—Gr. xx to ʒj, in solution, with diuretic infusions.

KALIUM OR POTASSIUM. (KA=39.)

This metal was discovered by Sir H. Davy in its oxide potash; he obtained the potassium by exposing caustic potash slightly moistened, to the action of a strong galvanic battery; when the metal appeared in globules, with hydrogen at the negative pole, oxygen escaping at the positive; it is now largely made from the residue of burned cream of tartar, mixed with powdered charcoal, and heated in an iron vessel, with a strong fire; as the potassium distils over, it is received in naphtha, but many precautions are necessary in procuring it. Potassium is a soft metal of silvery colour, and easily moulded by the fingers at ordinary temperatures; its den. is ·86, therefore lighter than water, which it floats upon and decomposes, burning with a brilliant violet flame, and forming the oxide potassa, which then combines explosively with the water; exposed to air, potassium tarnishes from absorbing oxygen, and must be preserved in fluids, such as naphtha, containing none of this element. At 32° this metal is hard and brittle, and fuses at 150°.

TESTS.—Potash, in solution, gives no precipitate with sulphuretted hydrogen which ordinary metals do; or with carbonate of soda as the alkaline earths. Potash or its carbonate, react strongly alkaline; and tartaric acid added in excess to its solutions, causes a white deposit of bitartrate of potash; when neutralized with muriatic acid, the bichloride of platinum produces a yellow precipitate; and its salts burned with alcohol, tinge the flame of a violet colour.

POTASSA CAUSTICA, D. POTASSÆ HYDRAS, L. POTASSA, E. (KO=47.) *Caustic Potash.*

Caustic potash, as employed in medicine, is always united with water, forming an hydrate. This is usually moulded in cylindrical sticks, and known as potassa fusa, lapis infernalis, or the potential cautery, from its powerful dissolving action on the tissues; if pure, it is in white hard masses, quite soluble in alcohol and water, but usually it is blue or greyish coloured from impurities; its taste is strongly caustic, and if moistened, it feels soapy from dissolving the cuticle; exposed to the air it deliquesces absorbing moisture and carbonic acid; at a low red heat potash fuses into an oily looking fluid, and at a higher temperature, volatilizes unchanged.

Preparation.—D. Boil solution of caustic potash in a silver or bright iron vessel till its water has evaporated; increase the heat until ebullition ceases, and the liquid flows like oil; pour it on a silver or iron dish, and the moment it sets, break it in fragments, and put it in a green glass stoppered bottle.

L. Evaporate solution of potash cong. j; in a clean iron vessel over the fire until the ebullition ending, hydrate of potash fuses; pour this into proper moulds.

E. Take any quantity of aqua potassæ, evaporate it in a clean covered iron vessel, increasing the heat gradually till an oily looking fluid remains, a drop of which removed on a rod becomes hard on cooling; then pour out the liquid on a bright iron plate, and when it solidifies, break it quickly and put it in glass stoppered bottles.

IMPURITIES.—Do not much interfere with its use, it generally contains some sulphate and carbonate of potash, oxide of iron and silica, all these are left on dissolving out the potassa by alcohol, and pure potash may be procured by evaporating the solution.

USES.—Caustic potash is employed in forming issues, but its tendency to deliquesce renders its application troublesome. The part is generally covered with two or three layers of adhesive plaster, having a hole cut in it, which should be smaller than the issue required; the skin is then slightly moistened, and a stick of potassa fusa rubbed on the aperture until the skin becomes discoloured. The adhesive plaster is then removed, and olive oil freely applied round the spot to prevent over action of the caustic; by poulticing, the eschar becomes detached in seven to twelve days, and the issue may be dressed with peas or savine ointment. Issues should not be made over the spines of the vertebræ or any prominent bony part; they are produced by the animal tissue combining with the alkali, and forming soluble albuminates and fibrinates of potash; their effects are fully described in surgical works. The following preparations are often used to form issues instead of potassa fusa.

Potassa Caustica, cum Calce, D. *Potassa cum Calce,* L. E.
Caustic Potash with Lime.

Preparation.—D. L. Hydrate of potash ℥j, lime ℥j; rub them together and keep in a stoppered bottle.

E. Evaporate aqua potassæ in a clean covered iron vessel to one third its volume, and add slacked lime until the mixture has the consistence of a firm pulp; keep it in closed vessels.

The lime renders the caustic potash less deliquescent and diminishes its corrosive action; in using the D. and L. preparations, they are made into a paste with spirits of wine.

Vienna Caustic Powder.—Mix equal parts of potassa cum calce and quick lime in powder. When used, it is made into a paste with alcohol, and placed on the skin in the aperture left in a piece of adhesive plaster, the size of the issue, and covered with a second piece of plaster; the issue is formed in about half an hour.

LIQUOR POTASSÆ CAUSTICÆ, D.
LIQUOR POTASSÆ, L. AQUA POTASSÆ, E.
Water of Caustic Potash.

The solution of potash is a colourless inodorous fluid; with a caustic acrid taste, browning turmeric paper, and feeling soapy when rubbed on the fingers; it corrodes white flint glass, and should therefore be kept in green glass bottles, closely stoppered, to prevent the absorption of carbonic acid from the atmosphere, which would rapidly change the caustic potash into a carbonate.

Preparation.—D. Dissolve pure carbonate of potash ℔j, in distilled water cong. j; heat to boiling in a clear iron vessel, and gradually add fresh burned lime ℥x, slacked with distilled water f℥vij; boil for ten minutes, constantly stirring; remove it from the fire, and when the insoluble parts subside, and the fluid is quite clear, transfer it by a syphon to a stoppered green glass bottle. Dens. 1068.

L. Slake lime ℥vij, add distilled water cong. ss, and mix in a closed vessel, with carbonate of potash ℥xv, dissolved in distilled water cong. ss; shake them frequently until they are cold; then set aside that the carbonate of lime may subside, and keep the supernatant liquor when poured off in a green glass stoppered bottle. Dens. 1063.

E. Slake fresh burned lime ℥ij, and with water f℥vij, form milk of lime; dissolve carbonate of potash (dry) ℥iv, in water f℥xxxviij; boil and add the milk of lime in successive portions, about an eighth of it each time, boiling briskly for a few minutes after each addition; pour the whole into a deep narrow glass vessel for twenty-four hours, and then with a syphon withdraw the clear liquid. It should at least amount to f℥xxxv, and have a density of 1072.

In this preparation the lime removes carbonic acid from the potash, carbonate of lime falling in small crystals during the boiling, and potash dissolving in the water. KaO,CO_2 and CaO. producing KO, and CaO,CO_2; air should be carefully excluded from it, as the fluid rapidly absorbs carbonic acid; and filtering it is injurious, the filters being chemically acted on.

IMPURITIES.—It generally contains some carbonate of potash, this is detected by adding an acid which causes effervescence; if sulphates are present they give a white precipitate with chloride of barium; and if the solution contains any lime, it should be neutralized with an acid, and carbonate of soda added to it which will produce a white precipitate.

USES.—Potash water is strongly caustic; if swallowed in a concentrated state, it causes the same symptoms that carbonate of potash would produce, and requires similar treatment; much diluted with water or bitter infusions, it is taken internally, and sometimes milk or fresh beer are used to conceal its unpleasant taste; it is powerfully antacid, hence it is employed to correct acidity of the stomach, but its action being chiefly confined to neutralizing the acid already formed, other remedies, as bismuth and vegetable tonics, are required to check the source of the disease. In treating lithic acid urinary deposits, its effects are also for the most part temporary; but the continued use of alkalies is liable to change this deposit into the worse one of phosphates; hence the least approach to alkalinity in urine while using alkalies, shews that they should be discontinued. For chronic eruptions, scrofulous affection of the glands, mesenteric disease, and some enlargements of the liver, potash has been much celebrated; in these disorders, Brandish's alkaline solution is frequently employed, but since the discovery of the effects of iodine in scrofulous affections, this remedy is usually combined with the potash, as iodide of potassium. In the treatment of excessive obesity, the continued administration of liquor potassæ has been found of much service.

ANTIDOTES.—Lemon juice, the vegetable acids, and oil.

DOSE.—Gtt x gradually increased to ʒj; it should be largely diluted.

Brandish's Alkaline Solution.—To six gallons of boiling water, add fresh quicklime ℔ij, American pearl ashes ℔vj; wood ashes ℔ij; mix, and in twenty-four hours draw off the clear solution. Its strength varies, and it contains other alkaline salts, besides caustic potash. Mr. Brandish gave it in doses of ʒij to iv. to adults, mixed with one drop of oil of juniper which disguises its taste, and with sufficient fluid to dilute it; he also directed good diet at the same time.

POTASSÆ CARBONAS, D. L. E. *Carbonate of Potash.*

(KO,CO=69.) IF CRYSTALLIZED HAVING 2 AQ.

The carbonate, or subcarbonate of potash, formerly called salt of tartar or of wormwood, is obtained by burning plants, which contain it in combination with vegetable acids; succulent plants are said to yield most potash, particularly those of the *cruciferous* and *composite* orders, and the leaves and twigs of trees afford more than the solid wood. Plants absorb potash from the soil in which they grow, as it is found in most clays and in the earthy minerals, such as mica and feldspar; when growing on the sea shore, plants frequently contain soda in place of potash, and if burned yield barilla, the impure carbonate of soda. Potash is prepared in America, Russia, and other countries where forests abound, from the brushwood piled in heaps and burned in a sheltered place or in pits; the ashes are collected and separated by washing into a soluble part called in America, black salt, containing carbonate of potash mixed with some sulphate, phosphate, and silicate of potash, and chlorides of potassium and sodium. The undissolved portion consists of salts of lime and alumina, silica, oxides of iron and manganese, and some unchanged charcoal. In America, lime is added before washing, which decomposing some of the other potash salts, changes them into an additional quantity of carbonate, of which the American ash contains eighty to eighty-five per cent, while that prepared in Russia has only seventy to seventy-seven per cent.

Lixivius Cinis, D. *Potassæ Carbonas Impura*, L. *Potashes.*

This is made by heating the impure black salt for several hours in iron vessels until perfectly fused, which purifies it by destroying the vegetable colouring matter; on cooling, it congeals in masses which are often of a red hue from iron; it is more pure and more caustic than the black salt. Pearlash is made by heating crude black salt in a reverberatory furnace, in which the flame beating over it, consumes all the impurities of vegetable origin, leaving a blueish white, caustic salt; the mass is frequently stirred during the process of roasting.

Potassæ Carbonas e Lixivio Cinere, D. *Potassæ Carbonas*, L. E. *Carbonate of Potash.*

Preparation.—D. Mix pearlash ℔x, distilled water cong. j; macerate for a week, occasionally stirring it, then filter through calico, and having evaporated the solution nearly to dryness, reduce the heat, and stir constantly with an iron rod until granular crystals are obtained. Keep these in stoppered bottles.

L. Impure carbonate of potash ℔ij, distilled water Oiss, dissolve and strain; pour it into a proper vessel, and evaporate the water that the liquid may thicken, afterwards stir it constantly with a spatula till the salt concretes.

E. Got from the potashes of commerce by lixiviating, evaporating, and granulating by fusion.

Earthy impurities are removed from the potash by solution and crystallizing, but it still contains some sulphate of potash, with chloride, and silica in variable quantity. It forms small white granular masses which are caustic and strongly alkaline; they rapidly deliquesce in the air, producing a liquid formerly called oleum tartari per deliquium: carbonate of potash is insoluble in alcohol, but dissolves in water, for which it has such an affinity, that it is used to remove the water from spirits in rectifying. Good carbonate of potash is "nearly all soluble in water; in an open vessel it spontaneously liquifies; it changes the colour of turmeric brown; when supersaturated with nitric acid, it gives no precipitate with carbonate of soda or chloride of barium, and but little with nitrate of silver; 100 parts, lose 16 of water by a strong heat, and the same quantity loses 26·3 parts of carbonic acid, on adding dilute sulphuric acid. L." "100 grains should lose by a red heat not more than twenty grains, and when dissolved and supersaturated with pure nitric acid, it gives a faint haze with nitrate of baryta, and is entirely precipitated by 100 minims of solution of nitrate of silver. E."

Potassæ Carbonas Purum, D. L. E. *Pure Carbonate of Potash.*

Preparation.—D. Place bitartrate of potash ℔ij in an iron pot or crucible, and constantly stirring it with an iron rod, expose it to a red heat until vapours cease to escape. Coarsely powder the residue; boil it for 20 minutes with distilled water Oij; filter through paper, washing the filter and its contents with susquicarbonate of ammonia ℥ss dissolved in distilled water Oj. Evaporate the solution to dryness, and a low red heat being finally applied, powder the product rapidly in a warm mortar, and keep it in well stoppered bottles.

L. Got by heating bicarbonate of potash to redness.

E. Prepared as L. or more cheaply, by dissolving bitartrate of potash in thirty parts of boiling water; washing the crystals which form on cooling; heating these to redness in a loosely covered crucible as long as fumes escape, roasting the broken down mass in an open crucible for two hours, occasionally stirring, then dissolving it in distilled water, filtering and evaporating the solution to dryness, granulating the salt towards the close by agitation, and heating it nearly to redness.

Common carbonate of potash is usually substituted for the purified preparation. When it is made from bicarbonate of potash, the heat employed, expels the second atom of carbonic acid; $KO,2CO_2$ forming $KO.CO_2$ and CO_2. If obtained from the ignition of cream of tartar, there is first formed a mixture of charcoal and carbonate of potash called black flux; the process of roasting ordered by D. and E. then burns out the charcoal, leaving the pure salt. D. directs carbonate of ammonia to be added, to convert any tartrate of potash accidentally remaining into carbonate of potash, and a tartrate of ammonia which the second heating perfectly removes. "It should not loose weight at a low red heat, and should give a faint or no precipitate with the nitrate of barytes or of silver, E," shewing its freedom from water sulphates or chlorides.

TESTS.—On adding an acid it effervesces, from carbonic acid escaping; it is distinguished from the bicarbonate of potash by deliquescing and by giving a brick red precipitate with corrosive sublimate, but if chloride of sodium is present, it prevents the action of this test.

USES.—Its effects are similar to liquor potassa, hence it may be given in these affections for which the latter is employed, but as an internal remedy, its unpleasant highly alkaline taste renders it less useful than the bicarbonate of potash. In large doses it acts as a powerful caustic, and has killed a child in three hours, by causing rapid inflammation of the larynx, and obstructing respiration. If taken, it produces similar symptoms to the strong mineral acids, and death may follow within a few hours; or if the patient survives the first shock of the injury, the destroyed tissues may separate, and when much of the stomach is thus injured, death may ensue from impaired digestion, the sufferer being slowly starved; or the ulcers left in the esophagus may cicatrize and contract gradually, causing stricture, which slowly increasing, may kill after a long period; a woman has died from this cause at the end of twenty years. The occurrence of poisoning by potash is generally accidental from drinking soap leys, or strong alkaline solutions. In small doses it is popularly given with cochineal as a remedy for hooping cough. To form effervescing draughts, it is less employed than the bicarbonate; twenty grains of it will saturate ʒiv of lemon juice, or about eighteen grains of either citric or tartaric acid; for external use, carbonate of potash ℥ss dissolved in water Oj, is employed as a lotion in some skin diseases, as lichen and prurigo, and for eruptions on the head.

ANTIDOTES.—Oil; the vegetable acids; vinegar, or in their absence, water in sufficient quantity to dilute the contents of the stomach, and thus diminish the corrosive effects of the poison.

DOSE.—Gr. v to xxx in solution.

Liquor Potassæ Carbonatis, D. L. *Solution of Carbonate of Potash.*

Preparation.—D. Pure carbonate of potash ℥x, distilled water Oj, dissolve and filter. Dens. 1310.

L. Carbonate of potash ℥xx, distilled water Oj, dissolve. Dens. 1473.

Dose.—Gtt. x to ʒss; in some mild fluid, the D. preparation is only half the strength of L.

POTASSÆ BICARBONAS, D. L. E. ($KO,2CO_2+HO$.)

Bicarbonate of Potash.

It forms colourlesss and odourless transparent crystals, which are modifications of a right oblique-angled prism; it is soluble in four parts of cold, or less than its own weight of boiling water. If boiled, it parts with some carbonic acid, and becomes changed into a carbonate; its taste is mildly alkaline, and it reacts as a feeble alkali on vegetable colours; it is unchanged in the air.

Preparation.—D. Dissolve carbonate of potash from pearl ash ℔j, in distilled water Oij; filter this into an Oiij bottle, capable of being tightly closed by a cork traversed by a glass tube long enough to pass to the bottom of the solution. A second bottle, in the bottom of which a few holes are drilled, and the mouth of which can be closed by a cork also traversed by a glass tube, is filled with chalk in small fragments ℔j, or a sufficiency, and placed in a glass or porcelain jar of the height of itself, but of somewhat larger diameter; the exterior end of the two tubes are to be connected air tight by a vulcanized india rubber tube; the cork of the carbonate of potash bottle being loosely, and that of the other bottle tightly arranged, and commercial muriatic acid Oiss being poured into the jar containing the perforated bottle with the chalk, the liberation of carbonic acid commences, and as soon as it is judged, that enough has been developed to expel all the air from the apparatus, the cork of the carbonate of potash bottle is to be made tight, and the process left to itself for a week, when numerous crystals of the bicarbonate will have formed; remove and shake them in a capsule with twice their bulk of cold water, rapidly decant this, next drain and dry them by mere exposure to the air, on bibulous paper. The mother liquid filtered and concentrated to one half, at a heat not above 110° will give more crystals. The tube in the potash solution must be occasionally cleared of crystals, with which it is liable to become plugged, or the process will be suspended.

L. Dissolve carbonate of potash ℔iv, in distilled water, cong j; pass carbonic acid through the solution to saturation, gently heat to re-dissolve any crystals that have formed; set the solution aside to re-crystallize and dry the crystals.

In these processes, carbonate of potash by absorbing more carbonic acid, is converted into bicarbonate; KO,CO_2 and CO_2, forming $KO,2CO_2$, which crystallizes, being less soluble than the carbonate; in many factories, more carbonate of potash is then dissolved in the residue of the process, carbonic acid again passed through it, and a fresh quantity of bicarbonate crystallized out.

with carbonic acid, becomes changed into red oxide of iron. The iodide of potassium which also forms, remains in solution, and can be crystallized. FeI and $KO,CO_2=KI$ and FeO,CO_2, of which the CO_2 escapes, and the FeO by combining with oxygen, falls as the red oxide Fe_2O_3.

TESTS.—It is known to contain iodine, by producing with a solution of corrosive sublimate the red iodide of mercury, which is soluble in excess of iodide of potassium; with protonitrate of mercury, it produces a greenish yellow deposit of subiodide of mercury; and with acetate of lead, a yellow iodide of lead, which is dissolved by heat, and falls in golden spangles as the solution cools. Iodide of potassium requires the addition of nitric acid to set iodine free, before forming the characteristic blue compound with starch; potash is detected in it by a solution of tartaric acid added in excess, producing a white precipitate of cream of tartar.

ADULTERATIONS.—Carbonate of potash may be present; it renders the salt deliquescent, and gives a milky precipitate with lime water; formerly great quantities of the carbonate were designedly added, in some instances amounting to more than half the weight of the iodide of potassium; its occurrence is now usually accidental, and is detected by being insoluble in strong alcohol, in which the iodide dissolves. Iodate of potash is sometimes found, when the salt is prepared by saturating iodine with caustic water of potash, a mixture of iodide of potassium and iodate of potash results, 6KO and 6I forming 5KI and KO,IO_5. This is afterwards exposed to a strong heat, to expel the oxygen and convert KO,IO_5 into KI and 6O. If all the iodate of potash is not decomposed, the salt by keeping becomes yellow. Mr. Scanlan tests its purity from this adulteration by adding tartaric acid, if pure the solution remains clear, a tartrate of potash and hydriodic acid forming; if it is impure, iodic acid also forms, and reacting on the hydriodic acid, sets iodine free, colouring the solution brown and turning starch blue. "Its solution is not changed or only made hazy by nitrate of barytes, and gr. v in distilled water f℥j, precipitated by excess of nitrate of silver, and agitated in a bottle with aqua ammonia, yields quickly by subsidence, a clear fluid not altered by excess of nitric acid, or merely rendered hazy. E." The barytes would precipitate any sulphate or carbonate, and the nitrate of silver is employed to detect any chloride the salt may contain; it precipitates the iodine as iodide of silver, and the chloride also would be deposited, but re-dissolved by the ammonia, and again fall as a white precipitate on adding excess of nitric acid.

USES.—Externally it is employed in ointment, to promote absorption in chronic or scrofulous swellings; and in solution it has been used for lotions and baths, often in combination with iodine, of which it is a powerful solvent; it is much employed internally in secondary syphilis, when there are periosteal affections, nodes, rheumatic pains or eruptions of long standing, and in most of the chronic diseases of venereal origin, is found of benefit; it may be given in water, or decoction of sarsaparilla either alone or combined with mercurial treatment. For chronic rheumatism, sciatica, and nervous painful disorders, it is largely employed; also in bronchocele, scrofulous affections of the glands or joints, and chronic tumors; indeed there are few chronic diseases especially of scrofulous character, for which it has not been used; it is generally taken much diluted with fluid, to promote its absorption. Some prefer its exhibition in large, others in small, long continued doses. The iodine it contains is the source of most of its utility, but the potash in it is also beneficial for scrofulous affections. With some persons, iodide of potassium is liable to disagree and cause purging or irritation of the stomach, perhaps from the formation of iodic acid; other effects, as salivation and headache, have been attributed to it, but they rarely occur. The iodine can be detected in the secretions of those using it, and even for days after, traces of it are found in the urine.

DOSE.—Usually gr. ij to v taken three or four times in the day in solution; it has been given in doses of ℈j, and even upwards of ʒij at a time, those excessive doses are more likely to do harm than good.

Unguentum Iodinii Compositum, D. L. *Unguentum Iodinei*, E. *Compound Iodine Ointment.*

Preparation.—D. Iodine ʒss, iodide of potassium ʒj; mix and add ointment of white wax ʒxivss.

L. Iodine ʒss, iodide of potassium ʒj; mix with rectified spirit ʒj, and add lard ℥ij.

E. Omits the spirit, using the same form as L.

Applied to enlarged glands, chronic swellings, &c., the bulk of a nut should be rubbed in, twice a day.

Unguentum Potassii Iodidi, D. *Ointment of Iodide of Potassium.*

Preparation.—Iodide of potassium ʒj, distilled water ʒss; mix and add ointment of white wax ʒvij.

When fresh this ointment is white, but occasionally decomposes if kept, the rancid fat setting iodine free and colouring it yellow; it is applied with friction over chronic tumors to aid absorption, and does not colour the skin like the compound ointment of iodine.

E. Rub carbonate of ammonia in fine powder ℥iijss, with carbonate of potash ℥vj, adding by degrees a little water until a smooth and uniform pulp is formed. Dry this gradually at a heat not above 140°, occasionally triturating towards the close, until a fine powder be obtained free of ammoniacal odour.

The carbonate of ammonia decomposes, its carbonic acid uniting with carbonate of potash, to form bicarbonate; and ammonia escaping with the heat.

IMPURITIES.—It may contain carbonate or sulphate of potash, or chloride of potassium; "a solution in forty parts of water, should not give a brick red precipitate with corrosive sublimate; and when saturated with nitric acid is not affected by the nitrates of barytes or of silver, E." shewing the absence of these adulterations; if there is but little carbonate present, it will not precipitate a solution of corrosive sublimate; "When heated, 100 parts of bicarbonate of potash, lose 30·7 parts, L."

TESTS.—It is known to contain carbonic acid, by effervescing with acids, the colourless and odourless gas escaping; potash is detected by the tests already mentioned.

USES.—This salt is preferred to the carbonate of potash, for correcting acidity of the stomach, or deposits of lithic acid (red sand) in the urine, and for preparing effervescing solutions; twenty grains of bicarbonate of potash neutralize ʒiijss of lemon juice, or fifteen grains of citric or tartaric acid; if kept in solution for any length of time, carbonic acid gradually escapes from the bicarbonate, and its effervescence is much impaired.

DOSE.—Gr. x to xx dissolved in water, two or three times daily

Liquor Potassæ Effervescens, L. *Aqua Potassæ Effervescens*, E.
Effervescing Potash Water.

Preparation.—Bicarbonate of potash ʒj, distilled water Oj, dissolve and transmit carbonic acid through the solution, under strong pressure.

A useless preparation in a pharmacopœia; it is sold as kali water by manufacturers of effervescing waters.

Lemon and Kali, or Citrated Kali for preparing effervescing draughts, is composed of dried white sugar ℔ij; citric acid ℥xiv, bicarbonate of potash ℥xvi, dry and powder each separately, then mix and add oil of lemon ʒj; this keeps better if bicarbonate of soda is substituted for the potash, it must be preserved in closed bottles.

IODIDUM POTASSII, D. L. E. (KI.=165.)

Iodide of Potassium.

This substance is also frequently called hydriodate of potash, it was first used by Coindet of Geneva; the iodide of potassium is in white, shining, opaque or transparent cubes or octohedrons, with a pungent saline taste, but odourless. It has no water of crystallization, and if pure, is not deliquescent in dry air; it dissolves in two-thirds its weight of water, and is very soluble in strong rectified spirit. Its solution has the power of dissolving iodine in large quantities; at a red heat, it fuses, and is volatilized unchanged.

Preparation.—D. Take pure iodine in powder ℥ivss, filings or thin turnings of wrought iron, separated from impurities by a magnet ℥ij, pure carbonate of potash ℥ijss or a sufficiency, distilled water Oiijss. Gently heat water f℥v, with the iron, and ℥iij of the iodine for twenty minutes, filter through paper, washing the filter with boiling water f℥v, and in the solution thus obtained, dissolve by digestion, and shaking the rest of the iodine, add it to the carbonate of potash dissolved in water Oij, and heated to 212° in a porcelain capsule, and boil till effervescence ceases, adding if necessary, a little more carbonate of potash, so that the liquid may be very slightly alkaline. Filter now, washing the precipitate with the remaining Oj of water, boiling hot. Evaporate the liquid till a pellicle forms, and crystallize. Dry the crystals on blotting paper, and keep them in a stoppered bottle. The mother liquid will by evaporation give more crystals.

E. With iodine ℥v, iron wire ℥iij, water Oiv, a solution of iodide of iron is made; (which see), add immediately while hot, dry carbonate of potash ℥ij, ʒvi, dissolved in a few ounces of water; stir carefully, filter and wash the powder on the filter with a little water. Concentrate the liquor at a heat short of boiling till a dry salt is obtained; it is purified from red oxide of iron by re-dissolving it in less than its weight of boiling water; or better, by boiling with twice its weight of rectified spirit, filtering the solution, and crystallizing it; by concentrating, the residual liquor will yield more crystals.

L. Put iodine ℥vj in distilled water Oiv, add iron filings ℥ij, occasionally stir with spatula for half an hour; apply a gentle heat, and when the mixture acquires a greenish colour, add carbonate of potash ℥iv, dissolved in water Oij; strain and wash the residue in boiling distilled water Oij, and again strain. Evaporate the mixed solutions and crystallize.

In this process, by the action of iodine and iron, an iodide of iron is procured, Fe and I forming FeI. On adding the carbonate of potash to this, carbonate of iron precipitates, which absorbing oxygen, and parting with carbonic acid, becomes changed into red oxide of iron. The iodide of potassium which also forms, remains in solution, and can be crystallized. FeI and KO,CO_2=KI and FeO,CO_2, of which the CO_2 escapes, and the FeO by combining with oxygen, falls as the red oxide Fe_2O_3.

TESTS.—It is known to contain iodine, by producing with a solution of corrosive sublimate the red iodide of mercury, which is soluble in excess of iodide of potassium; with protonitrate of mercury, it produces a greenish yellow deposit of subiodide of mercury; and with acetate of lead, a yellow iodide of lead, which is dissolved by heat, and falls in golden spangles as the solution cools. Iodide of potassium requires the addition of nitric acid to set iodine free, before forming the characteristic blue compound with starch; potash is detected in it by a solution of tartaric acid added in excess, producing a white precipitate of cream of tartar.

ADULTERATIONS.—Carbonate of potash may be present; it renders the salt deliquescent, and gives a milky precipitate with lime water; formerly great quantities of the carbonate were designedly added, in some instances amounting to more than half the weight of the iodide of potassium; its occurrence is now usually accidental, and is detected by being insoluble in strong alcohol, in which the iodide dissolves. Iodate of potash is sometimes found, when the salt is prepared by saturating iodine with caustic water of potash, a mixture of iodide of potassium and iodate of potash results, 6KO and 6I forming 5KI and KO,IO_5. This is afterwards exposed to a strong heat, to expel the oxygen and convert KO,IO_5 into KI and 6O. If all the iodate of potash is not decomposed, the salt by keeping becomes yellow. Mr. Scanlan tests its purity from this adulteration by adding tartaric acid, if pure the solution remains clear, a tartrate of potash and hydriodic acid forming; if it is impure, iodic acid also forms, and reacting on the hydriodic acid, sets iodine free, colouring the solution brown and turning starch blue. "Its solution is not changed or only made hazy by nitrate of barytes, and gr. v in distilled water f℥j, precipitated by excess of nitrate of silver, and agitated in a bottle with aqua ammonia, yields quickly by subsidence, a clear fluid not altered by excess of nitric acid, or merely rendered hazy. E." The barytes would precipitate any sulphate or carbonate, and the nitrate of silver is employed to detect any chloride the salt may contain; it precipitates the iodine as iodide of silver, and the chloride also would be deposited, but re-dissolved by the ammonia, and again fall as a white precipitate on adding excess of nitric acid.

USES.—Externally it is employed in ointment, to promote absorption in chronic or scrofulous swellings; and in solution it has been used for lotions and baths, often in combination with iodine, of which it is a powerful solvent; it is much employed internally in secondary syphilis, when there are periosteal affections, nodes, rheumatic pains or eruptions of long standing, and in most of the chronic diseases of venereal origin, is found of benefit; it may be given in water, or decoction of sarsaparilla either alone or combined with mercurial treatment. For chronic rheumatism, sciatica, and nervous painful disorders, it is largely employed; also in bronchocele, scrofulous affections of the glands or joints, and chronic tumors; indeed there are few chronic diseases especially of scrofulous character, for which it has not been used; it is generally taken much diluted with fluid, to promote its absorption. Some prefer its exhibition in large, others in small, long continued doses. The iodine it contains is the source of most of its utility, but the potash in it is also beneficial for scrofulous affections. With some persons, iodide of potassium is liable to disagree and cause purging or irritation of the stomach, perhaps from the formation of iodic acid; other effects, as salivation and headache, have been attributed to it, but they rarely occur. The iodine can be detected in the secretions of those using it, and even for days after, traces of it are found in the urine.

DOSE.—Usually gr. ij to v taken three or four times in the day in solution; it has been given in doses of ℈j, and even upwards of ʒij at a time, those excessive doses are more likely to do harm than good.

Unguentum Iodinii Compositum, D. L. *Unguentum Iodinei*, E. *Compound Iodine Ointment.*

Preparation.—D. Iodine ʒss, iodide of potassium ʒj; mix and add ointment of white wax ʒxivss.

L. Iodine ʒss, iodide of potassium ʒj; mix with rectified spirit ʒj, and add lard ℥ij.

E. Omits the spirit, using the same form as L.

Applied to enlarged glands, chronic swellings, &c., the bulk of a nut should be rubbed in, twice a day.

Unguentum Potassii Iodidi, D. *Ointment of Iodide of Potassium.*

Preparation.—Iodide of potassium ʒj, distilled water ʒss; mix and add ointment of white wax ʒvij.

When fresh this ointment is white, but occasionally decomposes if kept, the rancid fat setting iodine free and colouring it yellow; it is applied with friction over chronic tumors to aid absorption, and does not colour the skin like the compound ointment of iodine.

Tinctura Iodinii Composita, D. L. *Compound Tincture of Iodine.*

Preparation.—Iodine ℥ss, iodide of potassium ℥j; dissolve in rectified spirit Oj.

This may be added to water without depositing iodine; it is used internally in doses of gtt x, which can be gradually increased; and externally it is applied over tumors, &c., to promote their absorption, being painted on the skin with a small brush.

Potassii Iodidi Liquor Compositus, D. L. *Iodinei Liquor Compositus,* E.
Solution of Ioduretted Iodide of Potassium.

Preparation.—D. L. Iodine gr. v, iodide of potassium gr. x, distilled water Oj; dissolve.

E. Iodine ℥ij, iodide of potassium ℥j, distilled water ℥xvj; dissolve.

The E. solution is strong, that of D. and L. weak, the doses therefore differ considerably; it forms a reddish brown liquid, with a strong odour of iodine. *Dose* of D. and L. ʒij to ℥j; of E. gtt v to xv; diluted with water.

Iodine Paint.—Iodine ʒss, iodide of potassium ʒj, rectified spirit ℥j; dissolve. This is applied externally with a small brush, or with lint wrapped round a stick; the skin is coloured dark brown by all preparations containing free iodine, and with a strong solution such as this paint, the cuticle separates in scales, like the effects of blistering, but serous vesicles are rarely caused by it; this solution, or a weaker one, has been recommended, applied over the inflamed part in erysipelas, and around its edges, to check the extension of the disease, and it is used in all affections requiring some local irritation, combined with the absorping powers of iodine, as over chronic diseases of the joints, tumors, and diseased glands.

Lugol has given formulas for using iodine, dissolved in water, by iodide of potassium; his ioduretted solutions are made of three strengths:—

Iodine .. .. gr. ¾ .. gr. j .. gr. 1¼ } in water f℥viij, to
Iodide of Potassium gr. iss .. gr. ij .. gr. iiss } be taken daily,

His ioduretted baths contain, No. 1, water 200 quarts, iodine ʒij, iodide of potassium ʒiv; No. 2, water 240 quarts, iodine ʒijss, iodide of potassium ʒv; No. 3, water 300 quarts, iodine ʒiijss, iodide of potassium ʒvj.

POTASSII BROMIDUM, L. (BrKa.=117.)

Bromide of Potassium.

This salt crystallizes like iodide of potassium, in transparent or opaque white cubes, its taste is acrid and saline; it is inodorous, not deliquescent, very soluble in water, and slightly soluble in alcohol; it contains no water of crystallization; when heated, it decrepitates, and at a red heat fuses without decomposing.

Preparation.—L. To distilled water Oiss, add iron filings ʒj, and then bromine ℥ij; stir frequently with a spatula for half an hour, apply a gentle heat, and when the mixture becomes greenish, add carbonate of potash ℥ij and ʒj, dissolved in distilled water Oiss; strain and wash the residue with boiling distilled water Oij; again strain, evaporate the mixed fluids, and crystallize.

Bromide of iron is first formed, and then decomposed into carbonate of iron and bromide of potassium, by adding the carbonate of potash. Br and Fe produces BrFe, which with KO,CO_2 forms BrKa and FeO,CO_2, the carbonate of iron afterwards looses its carbonic acid, and by absorbing oxygen, becomes red oxide of iron.

ADULTERATIONS.—None usually of importance. The salt should not lose weight by heating, and it should be quite soluble in water; "100 grains of it, precipitated by nitrate of silver, should give 159 grains of bromide of silver; if chlorides are present as an adulteration, every three and a half grains more than this weight, denotes 10 per cent of impurity. Kane."

TESTS.—On adding sulphuric acid to the crystals, orange red fumes of bromine escape, which change starch of a similar colour.

USES.—It is employed for those affections in which iodide of potassium is useful, but has not been fully tried; as it is more irritating, it should be given in moderate doses. Dr. Williams thinks it has unusual powers in diseases of the spleen. Iodine is now so generally and usefully employed, that it is difficult to introduce bromide of potassium into practice, yet as bromine may be got in larger quantities, and cheaper, it appears worthy of trial, particularly for external use. The ointment is composed of bromide of potassium ʒj, lard ℥j, to this bromine gtt. x to xx may be added.

DOSE.—Gr. ij to v, in solution, two or three times daily; as much as gr. x to xv has been used.

HEPAR SULPHURIS, D. POTASSII SULPHURETUM, L. E. *Sulphuret of Potash.*

Liver of sulphur when recently prepared is hard and brittle, of a liver brown colour, inodorous if dry, but in moist air, or on the addition of an acid giving off sulphuretted hydrogen. Its taste is acrid and alkaline; if long kept it decomposes, becoming green and moist, then white and odourless from absorbing oxygen and water.

Preparation.—D. Mix sublimed sulphur ℥iv, and carbonate of potash from pearl ash, dried and powdered ℥vij, in a warm mortar; place them in a Hessian crucible, and heat at first gradually until effervescence ceases, then to low redness until perfectly fused, and let the liquid contents be poured into an iron cup, over which a second vessel should be inverted immediately, to exclude the air as completely as possible, while it is solidifying; the solid product, when cold, should be broken in fragments, and kept in a stoppered green glass bottle.

L. E. Take sulphur ℥j, carbonate of potash ℥iv; rub them together, and heat in a covered crucible, until they unite.

In this process, water and carbonic acid escape from the carbonate of potash, but the products vary according to the heat and the relative quantities used. Part of the potash gives up its oxygen, combines with some of the sulphur, and forms a ter or penta-sulphuret of potassium; the oxygen uniting with the rest of the sulphur, forms hyposulphurous or sulphuric acid, with which the remainder of the potash combines; the result being $3KS_5+KO,SO_3$ when one part of sulphur and two parts of carbonate of potash are melted together; with equal quantities fused, at a heat not above 482° the compound is $2KS_5+KO,SO_2$, at a higher temperature this changes to $3KS_5+KO,SO_3$.

TESTS.—Its disagreeable odour when added to water; if muriatic acid is mixed with the solution, sulphuretted hydrogen escapes, and sulphur is precipitated.

PURITY.—If good, its colour is liver brown; it produces with acetate of lead a red precipitate which afterwards becomes black.

USES.—Formerly it was employed as an antidote in poisoning with the metallic preparations; it should not be used for this purpose, its effects being those of a violent narcotico acrid, producing when taken, burning pain in the mouth, throat and stomach, great faintness, failure of the pulse, convulsions and insensibility. Death has ensued within fifteen minutes with a woman, after taking ʒiv of it; the room in which she lay had a strong odour of sulphuretted hydrogen. In this country, liver of sulphur is rarely used internally; it is given on the continent in the treatment of obstinate skin diseases and chronic rheumatism; externally it is employed for chronic eruptions, such as scabies and lepra. The *balneum sulphuratum*, or sulphur bath, is prepared by dissolving sulphuret of potash ℥iv in thirty gallons of water, they should not be mixed in metallic vessels; sometimes sulphuric or muriatic acid is added to the bath, it precipitates some sulphur, and disengages sulphuretted hydrogen which may prove dangerous by causing asphyxia, if the patient respires this deleterious gas, as it escapes from the bath. *Gelatinous* *sulphuretted baths*, in imitation of Barege water, are prepared by dissolving glue or gelatine ℔j, and mixing it with the sulphuret of potash bath. Lotions for chronic ulcers or eruptions on the scalp or body, are made by dissolving the sulphuret ʒij to ℥j, in water Oj, the solution when freshly prepared is yellow, and has a strong sulphuretted odour; after some days this disappears, and sulphur is deposited, the fluid becoming colourless and loosing its medical utility; an ointment is occasionally employed for skin diseases, consisting of sulphuret of potash ʒss mixed with lard ℥j.

ANTIDOTES.—In cases of poisoning by it, emetics should be given; and the chlorides of lime or soda, diluted with mucilaginous drinks.

DOSE.—For internal use gr. iij to iv in solution.

POTASSÆ BISULPHAS, D. L. E. (KO,SO_3+HO,SO_3.)

Bisulphate of Potash.

The bisulphate of potash or sal enixum, is procured in small, flat crystals of the right prismatic system, free from colour or smell, of a very acid taste, dissolving in two parts of cold water, and insoluble in alcohol; at a red heat, it loses one atom of sulphuric acid, becoming converted into neutral sulphate of potash; it reacts strongly acid on vegetable colours.

Preparation.—D. Take sulphate of potash ℥iij, pure sulphuric acid f℥j; mix in a small porcelain capsule; heat till they liquify, and till acid vapours cease to be given off; the bisulphate concretes as it cools, and should be finely powdered, and kept in well stopped bottles.

L. Take the salt remaining after distilling nitric acid ℔ij; dissolve in boiling water Ovj, add sulphuric acid ℔j, boil and crystallize.

E. Similar to L. using sulphuric acid f℥vij ʒj.

The saline residue after distilling nitric acid is bisulphate of potash, sulphuric acid is added to convert any neutral sulphate of potash, accidentally present, into bisulphate.

TESTS.—Sulphuric acid is detected in it by chloride of barium, giving a copious white precipitate insoluble in acids; its solubility, acid taste, and reaction, distinguish it from the neutral sulphate of potash.

USES.—It is a mild purgative, and from its acid taste, has been used to disguise the flavour of rhubarb; it is rarely employed.

DOSE.—Gr. xx to ʒj diluted with sufficient fluid.

POTASSÆ SULPHAS, D. L. E. (KO,SO_3.)

Sulphate of Potash.

This salt is also called vitriolated kali, sal polycrest, or sal de duobus; it is found in alum and some minerals, and mineral waters, in the juices of many plants, and in the animal fluids. It is obtained as small, hard, and odourless crystals, forming single or double six-sided pyramids, usually with a prism between them; its taste is saline and bitterish; it requires sixteen parts of cold, or five of boiling water to dissolve in, and is insoluble in alcohol; it contains no water of crystallization, and remains unaltered by exposure to the air.

Preparation.—D. Slake fresh burned lime ℥vj in water f℥iv; dissolve the residue of the process for making pure nitric acid ℔j, in water Oj ℥xvj; heat this to boiling, and add to it gradually, the slaked lime, till it restores the blue colour of reddened litmus paper; filter the solution through calico; heat it to boiling, and add carbonate of potash ʒj, or as long as there is any precipitate; again filter, add dilute sulphuric acid fʒvj, or sufficient to produce a neutral or very slightly acid solution, evaporate till a film forms on the surface, set by for twenty-four hours, dry the crystals then formed on blotting paper, and keep them for use.

L. Take of the salt remaining after making nitric acid ℔j, ignite in a crucible till the excess of sulphuric acid is expelled, then boil in water cong. ij till a pellicle floats, filter and set it aside to crystallize.

E. Dissolve ℔ij of the salt in water cong. ij, add white marble in powder till effervescence ceases, and the solution is neutral, then filter and evaporate it, to form crystals.

L. directs heat to expel the excess of acid from bisulphate of potash, which is the residue of making nitric acid; the neutral sulphate of potash remains. E. employs marble to saturate the excess of acid; carbonic acid escapes, and an insoluble sulphate of lime forms, which is separated by filtering. D. uses quick lime for the same purpose; as some of this dissolves in the solution, a little carbonate of potash is added, to get rid of it, and then some dilute sulphuric acid to neutralize any excess of the potash.

TESTS.—Chloride of barium gives a white precipitate, insoluble in acids, with the sulphuric acid in the salt; it is distinguished from the bisulphate by its saline taste and insolubility.

USES.—In France it is employed as a mild purgative for females after delivery, to facilitate the secretion of milk: and when mixed with rhubarb in powder or solution it acts as a gentle aperient, which is used for children and in dyspeptic and hepatic affections; from its hardness it is added to Dover's powder to divide the opium and ipecacuan. In large doses, as ℥j to ij, it is found to be an irritant poison, and even ʒij has acted severely; it causes pain in the stomach, vomiting, purging, cramps, and rapid death.

DOSE.—Gr. xv to ʒij. The larger doses of this salt should always be given fully dissolved in fluid; with children, large doses are likely to cause vomiting.

Potassæ Sulphas cum Sulphure, E. *Glaser's Sal Polychrest.*

Preparation.—Nitrate of potash and sulphur, of each equal parts; mix thoroughly, and throw in small successive portions into a red hot crucible; when the deflagration ceases, and the salt cools, powder and keep it in closed bottles.

It probably contains sulphate mixed with some sulphite of potash; it is more soluble than the ordinary sulphate, and when in solution has a sulphurous odour, but does not disengage sulphuretted hydrogen on adding acids. It is a mild cathartic, and is said to act similarly to those sulphurous waters containing neutral salt.

Dose.—ʒss to ʒj. This preparation is seldom employed.

POTASSÆ NITRAS, D. L. E. (KO,NO_5=101.)

Nitrate of Potash.

Nitre or saltpetre is imported into these countries chiefly through Calcutta; it is obtained in the East Indies by dissolving in water the saline ingredients of the earth, which contains potash and lime, combined with nitric acid derived probably from decomposed ammonia of the atmosphere; the surface of the earth in some places, from the efflorescence of these salts becomes white like hoar frost; by dissolving them out, and filtering the solution through wood ashes, any nitrate of lime in it is decomposed into nitrate of potash, and when evaporated an impure salt forms, containing from forty-five to seventy per cent. of nitre, after recrystallizing it is imported, but is still impure, the adulterations are called in commerce refraction, and require to be separated before it is used. On the continent, nitre is made from decaying animal and vegetable matters, mixed in beds or walls with earth and lime, they require to be defended from rain; after two or three years the earth becomes impregnated with nitre, which can be separated by washing, and crystallized.

Nitre usually forms long, striated, six-sided prisms with dihedral summits, colourless, and of a cooling sharp saline taste; it is anhydrous, soluble in four parts of water at 60°, or in less than one part of boiling water, and insoluble in alcohol; if strongly heated it fuses and may be cast into tablets or balls, called sal prunelle; at a higher heat it decomposes, giving off oxygen, then some nitrogen, and forming hyponitrite of potash; when thrown on glowing coals, nitre rapidly ignites or deflagrates.

Potassæ Nitras Purum, D. *Pure Nitre.*

Preparation.—Dissolve commercial nitre lbiv, in distilled water Oij, at a boiling temperature, withdraw the heat, and stir constantly, that minute crystals may be got; these, deprived as much as possible of the uncrystallized solution by decanting and draining, should be washed in a glass or earthenware percolator with distilled water Oiij, or till the liquid which trickles through, gives no precipitate with nitrate of silver; then remove the contents of the percolator, and dry it in an oven.

ADULTERATIONS.—Alkaline chlorides and sulphates, and salts of lime may be found in ordinary nitre; sulphates give a white precipitate with soluble salts of barium, not acted on by acids; chlorides, a white deposit with nitrate of silver, soluble in ammonia; and lime, a white precipitate with oxalic acid. The impurities of ordinary nitre are roughly determined by placing a weighed quantity of it in a cold saturated solution of pure nitre, this will dissolve no more of the salt, but takes up the adulterations; after a time the undissolved part is removed and dried, its loss in weight shews the amount of impurities dissolved out.

TESTS.—It is known to be a nitrate by adding sulphuric acid to it, and then a little morphia or strychnine, which at once becomes red.

USES AND DOSES.—An over dose of nitre is occasionally taken by accident instead of the common purging salts; when one to two ounces of it are used, particularly in a concentrated solution it may cause profuse diarrhœa, with vomiting and epigastric pain, and death sometimes occurs in a few hours from its effects; a man has died in two hours, with violent pain and vomiting, after taking ℥iss of nitre; convulsions and insensibility have also been observed in these accidents; but doses nearly as large are safely taken if much diluted, and they are even given with advantage in acute rheumatism, for which it was originally employed by M. Gendrin, the average dose for this purpose is ʒiij to iv taken in barley water Oij to iij as ordinary drink during the day, increasing the quantity gradually, until as much as ʒiss of nitrate has been given, diluted with a proportional amount of fluid, it causes generally diuresis, or with some, diaphoresis; the pain soon subsides, and within six to ten days the disease usually disappears. It has not yet been sufficiently tried in this country, but the presence of an excess of fibrin in the blood during rheumatism, and the danger of its deposit on the hearts' valves, in connexion with the power of nitre in controlling coagulation of this substance, renders its use intelligible. In moderate doses, nitrate of potash acts as a diaphoretic; and when employed with this intention, the skin should, at the same time, be kept warm; for slight colds, ʒi to iss of it is popularly given, dissolved in a tumblerful of whey at bed time, forming *nitre whey;* or it may be prescribed in solution with acetated water of ammonia and antimonial wine, or with the saline mixture, in febrile and inflammatory affections, unless the bowels or kidneys are disordered, when its irritating action might be injurious. For hœmorrhages, particularly hœmoptysis it is administered in doses of gr. xxx to xl, and should be taken immediately after dissolving in water, from the cold its solution causes, being of benefit in this class of diseases; as a diuretic the nitrate is not so certain as the acetate of potash, if it is used, the solution should be much diluted to favor its absorption, and the skin kept cool; dose gr. x to ʒi. For producing cold, nitre ℥v, and muriate of ammonia ℥v, may be dissolved in water f℥xvj, it reduces the temperature 40°, and may be applied as a cold lotion.

ANTIDOTES.—None; the poison should be removed by emetics or the stomach pump; mucilaginous fluids then given, and the inflammation which may arise treated as usual.

POTASSÆ CHLORAS, D. L. (KO,ClO_5.)

Chlorate of Potash.

The chlorate or oxymuriate of potash forms colourless, brilliant, rhomboidal scales; its taste is cool and saline, somewhat resembling nitre, it dissolves in sixteen parts of cold, or in two of boiling water; when rubbed in the dark the crystals become luminous; they deflagrate if thrown on hot coals, and explode violently if rubbed with sulphur or phosphorous; as this is not free from danger, only small portions of these substances should be used for such experiments; ordinary lucifer matches are made of chlorate of potash mixed with sulphur, and coloured by sulphuret of antimony or cinnabar.

Preparation.—This salt is obtained by passing chlorine gas into a strong solution of potash, until it is neutralized, when chloride of potassium and hypochlorite of potash form; 2KO and 2,Cl producing K,Cl and KO,ClO; on boiling the liquid, oxygen is disengaged, and chlorate of potash is procured, mixed with chloride of potassium, nine atoms of KO,ClO becoming changed into 12O and KO,ClO_5, the chlorate of potash deposits on standing some hours, and is purified by recrystallizing.

Graham directs it to be made by exposing two parts of carbonate of potash and one part of lime to chlorine gas; carbonate of lime, chloride of potassium and chlorate of potash form, by dissolving in water the insoluble carbonate of lime is separated, and chlorate of potash can be obtained by crystallizing the solution.

TESTS.—When this salt is heated it disengages oxygen and chloride of potassium remains, with which nitrate of silver then gives a white precipitate, soluble in ammonia; chlorate of potash is unaffected by the test until it is decomposed by heat; when sulphuric acid is added to it, chlorous acid gas is formed, this gas is yellow, it has an aromatic odour, and is explosive if heated.

IMPURITY.—Chloride of potassium is the usual adulteration, it is detected by giving a white precipitate with nitrate of silver.

USES.—Chlorate of potash is employed to prepare oxygen, one grain of it, giving when heated about one cubic inch of gas; its medical effects are analagous to nitre; formerly it was used in diseases such as scurvy, supposed to depend on deficiency of oxygen, and as a substitute for mercury in treating syphilis and hepatic affections, from the supposition that both medicines acted by conveying oxygen to the system; lately it has been administered in scarlatina and continued fevers; for this purpose ʒj of the salt is dissolved in a pint of water, and Oj to Oiss taken daily as the usual drink; it is said to improve the secretions, the tongue becoming moist and clean under its use. In cholera, yellow fever, and other diseases, considered by Dr. Stevens to depend on diminution of the salts of the blood, he advised the exhibition of chlorate of potash, chloride of sodium, the carbonate and phosphate of soda, &c., in diluted solution and by enema; some practitioners have also employed these salts by transfusing a warm saline solution into the veins; the statements of the effects of this treatment are very contraditory, but the practice has nearly fallen into disuse.

DOSE.—Gr. x to xv dissolved in some mild fluid.

POTASSÆ ACETAS, D. L. E.

($KO,+C_4H_3O_3$ OR KO, ACET.) *Acetate of Potash.*

Acetate of potash or diuretic salt is said to be contained in the sap of many plants, and has been known since the thirteenth century; it is met in white foliated masses composed of colourless scales, without odour when dry, but having a faint acetous odour when moistened, of a pungent saline taste, and soapy to the touch;

it is extremely deliquescent, and hence must be kept in carefully closed bottles; this substance is very soluble in water and alcohol, 100 parts of cold water dissolving 102 parts of it. When heated it decomposes, giving off acetone, and leaving a residue of carbonate of potash.

Preparation.—D. To commercial acetic acid of dens. 1044, Oij, placed in a porcelain capsule, add gradually pure carbonate of potash ℔j, when effervescence ceases, boil for a couple of minutes, and add, if necessary, a few drops more of the same acetic acid, that the solution may react slightly acid, then evaporate to dryness. Melt the residue in a clean iron pot by careful heat, remove the liquified salt from the fire, and when on cooling it solidifies, break it quickly in fragments, and keep in stoppered bottles.

L. Acetic acid f℥xxvj, distilled water f℥xij, mix and add carbonate of potash ℔j or to saturation; evaporate in a sand bath, gradually heating till the salt is dried.

E. Pyroligneous acid Oiss, add dry carbonate of potash ℥vij, or enough to neutralise the acid, evaporate with a vapor bath till it concretes, on cooling break up the mass and keep in closed bottles.

In this process, carbonic acid escapes, the acetic acid taking its place and forming acetate of potash, which is afterwards fused; acetic acid and KO,CO_2 producing KO. acet. and CO_2,

IMPURITIES.—It may contain carbonate of potash; this causes it to react alkaline, but when pure the salt is neutral; if ordinary vinegar is used in the preparation, the product has a brown hue, heat will destroy this colour and purify it, but if too strongly applied, the acetate is decomposed; it should be snow white.

TESTS.—On heating acetate of potash with sulphuric acid, a strong acetic odour is disengaged; and if heated with equal weights of sulphuric acid and alcohol, a characteristic odour of acetic ether is produced.

USES.—In large doses it acts as a purgative, producing watery evacuations, but in these countries it is not prescribed for this purpose; on the continent it is employed in the treatment of jaundice and dropsies, and being considered an alterative, is used in glandular diseases; taken in small doses, diluted in sufficient fluid, it acts as a good diuretic; for dropsical affections it is usually combined with infusion of juniper or broom, and the dose frequently repeated; it is rapidly absorbed and changed in the circulation into carbonate of potash, which passes off through the kidneys, and may therefore be employed to correct excessive acidity of the urine.

DOSE.—Gr. xx to ʒiss as a diuretic; ʒij to iij as a cathartic.

POTASSÆ BITARTRAS, D. L. E. (KO,2 TART +HO.)

Bitartrate of Potash.

Potash exists combined with tartaric acid in many vegetables, but all the bitartrate of potash or cream of tartar of commerce is obtained from grapes, being deposited in an impure form during their fermentation; in which process, as the sugar of grapes becomes changed into alcohol, the cream of tartar being less soluble in the alcoholic mixture than in pure grape juice, deposits on the side of the wine casks, and is afterwards collected and sold as crude tartar or argol, which has a white or red hue, as it is prepared from pale or red wine, and carries down more or less colouring matter with it. The argol is purified by boiling it in water, and roughly crystallizing, again dissolving the crystals in water, adding charcoal and alumina to remove the colouring matter, and slowly cooling the solution. When purified, cream of tartar is deposited in right (oblique, according to Liebeg) rhombic prisms, which are hard and gritty; it is unaltered by exposure to the air, insoluble in alcohol, and soluble in sixty parts of cold water, or eighteen (7 Kane.) of boiling water. When heated, it decomposes, leaving a mixture of carbonate of potash and charcoal, called black flux; if this is strongly heated with an equal weight of nitre, the charcoal is burned out, and pure carbonate of potash or white flux remains; in commerce, cream of tartar is sold in fine powder, it is hence liable to adulterations.

ADULTERATIONS.—100 parts of bitartrate of potash usually contain from two to six parts of tartrate of lime, and even fourteen per cent of this impurity has been found in it The sulphate and carbonate of lime have also been extensively used as adulterations; these may be detected by adding oxalate of ammonia to a solution of the cream of tartar, which precipitates any lime as an oxalate; if alum or bisulphate of potash are used to adulterate it, chloride of barium causes a copious white deposit of the sulphate of barytes which is insoluble in acids; "cream of tartar is soluble in forty parts of boiling water; fifty grains of it are neutralized by thirty grains of carbonate of soda, and when then precipitated by seventy grains of nitrate of lead, is precipitable by more of the test. E."

TESTS.—When strongly heated, it disengages a peculiar odour, then blackens, and finally leaves white carbonate of potash, to which the usual tests can be applied; these effects, with its sparing solubility in water, and its power of dissolving precipitated oxide of antimony, will readily distinguish it.

Uses.—A large dose of cream of tartar acts as a purgative, but is seldom given alone; it is generally combined with sulphur in the form of an electuary, and is much used in skin diseases, and for hœmorrhoids and other affections of the rectum; when mixed with jalap, forming the compound jalap powder, it is employed as a hydragogue cathartic in dropsical affections or other diseases requiring active purgation; if administered for its cathartic effects, it is usually imperfectly dissolved, as solution appears to impair its purgative action; in excessive doses it has proved fatal, thus, a man after taking four or five table-spoonfuls of it, had violent purging, vomiting, and pain in the abdomen; he died in forty-eight hours, and on inspection, his stomach and bowels were found highly inflamed. In small doses, dissolved in a large quantity of fluid, bitartrate of potash acts as a diuretic, and is much employed in dropsies; it is frequently given combined with other diuretics in electuary or mixture to increase their action. During febrile attacks, a solution of this salt, called imperial, is employed as a refrigerating drink, it is made by dissolving bitartrate of potash ʒj to ij in boiling water Oj, and flavouring with sugar and lemon, usually some cream of tartar subsides as the fluid cools, it should therefore be strained off into another vessel, and may be taken as the ordinary drink. Cream of tartar whey is prepared by adding to boiling new milk, enough cream of tartar dissolved in hot water, to curdle it, and draining off the curd; either this whey, or imperial may be employed in febrile diseases, or to increase the operation of diuretics, and when taken warm, they powerfully aid diaphoresis.

A good tooth powder may be made of bitartrate of potash ℥j, prepared chalk ℥ij, myrrh ℥j, orris powder ʒss, otto of roses gtt. vj.

Dose.—As a purgative, ʒij to iv; when combined with other purgatives, ʒj to ij; as a diuretic, ʒss to iss may be given in solution, in repeated doses.

POTASSÆ TARTRAS, D. L. E. (KO, Tart Acid.)

Tartrate of Potash.

Tartrate of potash or soluble tartar is usually sold in small white granular masses, from being stirred and rapidly evaporated during its preparation; it may also be got with difficulty, in crystals, which are modifications of a right rhombic prism; its taste is bitterish and saline; 100 parts of cold water dissolve 130 parts of this salt, and boiling water dissolves 268. When pure it does not deliquesce, if exposed to air; and should not change turmeric or litmus paper, but react neutral.

Preparation.—D. Dissolve carbonate of potash from pearl ash, ℥viij, in distilled water, cong. ss, and to this while boiling hot, add bitartrate of potash ℔j, or a sufficiency, until the liquid after boiling for a couple of minutes ceases to change the colour of litmus; filter through calico, evaporate till a pellicle forms, and crystallise; after twelve hours, pour off the liquid, dry the crystals on bibulous paper, and keep them in a stoppered bottle.

L. E. Dissolve carbonate of potash ℥xvj in boiling water Ovj, add bitartrate of potash ℔ij, or enough to neutralize the liquor; filter, boil down until a pellicle forms, and crystallize; the residual fluid by further evaporation yields more crystals.

In this process, the carbonate of potash is decomposed, its carbonic acid escaping, and its potash uniting with cream of tartar to form neutral tartrate of potash. KO,CO_2, and KO, 2 tart. producing 2KO, tart. and CO_2.

TESTS.—The salt gives white precipitates with nitrate of silver and acetate of lead, soluble in nitric acid; if excess of tartaric or sulphuric acid is added to a strong solution of tartrate of potash, a crystalline deposit of cream of tartar falls; heated to redness, it decomposes into carbon and carbonate of potash, and when dissolved and filtered, the clear solution can be tested for potash.

IMPURITIES.—Tartrate of potash usually contains carbonate of potash, which renders it deliquescent and changes turmeric paper brown; any excess of cream of tartar would redden litmus paper. "Forty-four grains in solution are not entirely precipitated by fifty-five grains of nitrate of lead E." This shews the presence of a proper proportion of tartaric acid.

USES.—It acts as a mild saline purgative, and is frequently employed as an addition to infusion of senna or powdered rhubarb, being stated to prevent griping, but this is doubtful; in prescribing it, all acids are incompatible, as they decompose the salt and form cream of tartar; when used internally, it is partly absorbed and excreted from the kidneys, as carbonate of potash, and hence has some diuretic action; it must therefore be avoided when the urine deposits alkaline salts.

DOSE.—ʒiss to vi, given in solution.

AMMONIA. (NH_3=17.)

The great resemblance in chemical properties, in the salts it forms, and even in medical effects, between ammonia and the alkalies potash and soda, render it most convenient to consider this substance immediately after these alkalies. Ammonia is often termed the volatile alkali; it is a compound substance formed by the union of the gasses, nitrogen and hydrogen, one of them at least being in a nascent condition at the time. It is largely produced during the decay of animal and vegetable matters, containing nitrogen, and escaping into the atmosphere, is condensed by the rain, and carried into the earth which it fertilizes, affording an important portion of the food of plants. The animal secretions as sweat and urine, also yield ammonia, and urea consists of the same elements as carbonate of ammonia. Ammoniacal gas was obtained by Dr. Priestly, it is colourless, of a pungent odour, and reacts strongly alkaline, browning turmeric paper, but being volatile, the stain soon disappears; it is much lighter than air, its dens. being ·589, and under pressure of six atmospheres can be condensed into a clear liquid; the gas is not a supporter of combustion, but is slightly combustible; it consists of three volumes of hydrogen, and one of nitrogen condensed into two volumes.

Preparation.—By heating five parts of slacked lime and four of powdered sal ammoniac in a retort, the gas forms, and must be collected over mercury, as water rapidly absorbs it; for ordinary purposes it may be obtained by inverting a dry glass vessel over the tube of the retort, when the light gas ascending, expels the air and fills the vessel; or by heating water of ammonia in a glass jar, enough gas speedily escapes for experiments.

In preparing it, sal ammoniac is decomposed, its hydrochloric acid uniting with the lime, forming water and chloride of calcium, while ammoniacal gas escapes; NH_3,HCl and CaO, changing into NH_3, $CaCl$ and HO.

TESTS.—Its peculiar odour, and the brown stain it causes on turmeric paper, which soon disappears; ammonia forms dense white fumes when a rod dipped in muriatic acid is brought near it; by heating any substance containing ammonia with caustic potash, the gas is disengaged and easily recognized; its solutions give with bichloride of potassium a yellow precipitate, the double chloride of platinum and ammonia, when heated this looses the ammonia, and spongy platinum remains; with bichloride of mercury it produces a white precipitate; and with sulphate of copper a pale blue deposit, soluble in excess of ammonia, forming a purple liquid.

THEORIES.—Sir R. Kane considers ammonia to be a compound of hydrogen united with a substance composed of NH_2, called amidogene, or the ammonia former, being an amidide of hydrogen; this view is supported by many chemical changes in which the supposed body NH_2 forms combinations. Berzelius considered ammonia to be NH_4O, an oxide of a suppositious metal, ammonium NH_4; it is found, in favour of this view, that all the ordinary ammonical salts contain an atom of water, and that by exposing mercury to a galvanic current in water of ammonia, an amalgam forms, which decomposing when the current ceases, gives off hydrogen and ammoniacal gas.

LIQUOR AMMONIÆ, D. L. AQUA AMMONIÆ, E.

Water of Caustic Ammonia.

Is made by dissolving ammoniacal gas in water, which is capable of absorbing at 32°, 780 times its bulk of this gas, heat is evolved, the solution augmenting two thirds in volume and boiling at 120°. The odour of water of ammonia is powerfully pungent, its taste very alkaline and corrosive; its density and boiling point vary in proportion to the quantity of gas it holds dissolved. L. and E. direct its density to be ·960; one cubic inch then contains 132 inches of gas; in addition, they have a stronger solution of dens. ·880, one cubic inch of which is equal to 400 inches of the gas; D. orders its density to be ·950, and has also a liquor ammoniæ fortior of dens. ·900; when exposed to the air, water of ammonia absorbs carbonic acid, and ammoniacal gas escaping, it gradually becomes weakened.

Preparation.—D. Slake fresh burned lime ℥viij, with water f℥iv, when cool, triturate with sal ammoniac in powder ℥viij; place the mixture in a glass matrass or an iron bottle, and having closed it by a cork perforated with a tube to convey off the gas, apply with a sand bath a gentle heat, gradually increasing it, and cause the ammonia as evolved to pass first through a small Wolfe's bottle, having a syphon safety tube containing mercury, and then to the bottom of an Oj bottle containing distilled water f℥xvj; keep this cool as the gas is absorbed, by surrounding it with cold water.

L. Slake lime ℥viij, with some water, and put it in a retort with hydrochlorate of ammonia ℥x, broken in small pieces, add the rest of Oij water, and distil f℥xv.

E. Slake quick lime ℥xiij, with water f℥vijss; when cool, mix quickly with powdered muriate of ammonia ℥xiij, and place it in a retort, having a receiver attached with a safety tube, connect the receiver with a bottle, having a safety tube, and holding distilled water f℥iv, but capable of holding f℥viij; connect this with another bottle loosely corked, and holding distilled water f℥viij, the connecting tubes must dip to the bottom of the bottles at the further end from the retort, and the receiver must be cooled by ice or running water; heat the retort till gas ceases to be evolved, remove it, corking up the aperture of connexion with the receiver, and apply to the receiver a gentle heat gradually increased, to drive over as much gas and as little of the water as possible; the liquid in the last bottle if not of dens. ·960, is made weaker by adding water, or stronger by adding some of the strong aqua ammoniæ in the first bottle.

The same changes occur as in making ammoniacal gas; for *tests* see ammonia.

IMPURITIES.—Usually some carbonate of ammonia, this effervesces with dilute acids, and gives a precipitate on adding lime water; when neutralized by pure nitric acid, it should not precipitate with nitrate of silver or carbonate of ammonia, shewing the absence of chlorides or lime; the liquor ammoniæ of commerce being procured from the waters of gas houses often contains a substance named pyrrhol, on adding nitric acid, this adulteration becomes red.

EFFECTS.—The strong solution is employed to add pungency to carbonate of ammonia in scent bottles, for this purpose a volatile essence is made of rectified spirit f℥iiss, strongest aqua ammoniæ f℥j, oil of lavender fʒiij, oils of bergamot, neroli, and lemon, of each forty drops, and coloured with saffron. Ammonia vapour is useful in fainting, sometimes for warding off epileptic attacks, and in poisoning by chlorine, prussic acid, or oil of bitter almonds; its excessive use is dangerous, and has produced pulmonary inflammation and death from protracted application during the insensibility of a fit. Applied externally, it is capable of acting as a rapid and severe blister; this may be effected by laying on the part a piece of cloth damped with it, for a quarter or half an hour; or speedy counter-irritation may be produced by dropping the strongest liquor ammoniæ on lint, and placing this in a cupping glass over the skin, removing the glass in a few minutes, and re-applying it elsewhere; an objection to its use is the smarting it causes, this is much relieved by washing the surface with dilute vinegar; in a weaker form, ammonia enters into most of the stimulating liniments used for old sprains, rheumatic and neuralgic affections, and as a counter-irritant in some inflammatory attacks, as sore throat arising from cold. If taken in large quantity or concentrated, ammonia is a powerfully corrosive poison; one instance is related in which it proved fatal in four minutes; the symptoms it produces are similar to potash, but more severe, with burning pain in the throat and stomach. In diluted solution, although liquor ammoniæ itself is rarely employed, its preparations are much used internally; its action is more temporary than that of alcoholic fluids, and the excitement of circulation caused by it, soon subsides; during its use, the excretions of the skin, kidneys, and frequently of the bronchial membrane, are increased; it is therefore given in many febrile attacks for which wine is not employed. Dr. Billing considers it operates first as a local stimulant, but being rapidly absorbed, unites with the acids of the blood, and acts as a sedative to the capillary circulation; it is often prescribed in continued fevers, when the period of stimulation arrives, before the physician employs wine; and in cases requiring additional stimuli besides alcohol, it is found useful; the aromatic spirit of ammonia and other preparations are given with these intentions in camphor mixture, &c. For slight feverish attacks, and eruptive diseases, the saturated solution of carbonate of ammonia and lemon juice is often directed; it acts as a gentle stimulant, causing increased perspiration; but in more severe fevers, the employment of this and other routine sudorifics is likely to do more harm than good, by interfering with the regular course of the disease, and deranging the stomach already disordered by sickness. When measles, scarlatina, or small pox produce symptoms of great depression, and failure of vital power, and the eruption has not fully appeared, or has receded from the skin, the carbonate or aromatic spirit of ammonia are of great benefit, and usually employed; in suffocative catarrh, in the bronchitis of old persons, the last stages of pneumonia, and those sudden congestions called blue pneumonia, it is much prized in addition to expectorants and other means of stimulation; in the insensibility of intoxication, after using the stomach pump, and in poisoning by vegetable sedatives, as tobacco or foxglove, ammonia is of benefit; for hysterical affections, though stimulants are often of temporary service, their continued administration must be avoided, as it might lead to their abuse and neglect of more permanent means of cure.

ANTIDOTES.—Vinegar and the dilute vegetable acids; inflammatory symptoms, when they arise, are treated as usual.

DOSE.—Gtt x to xx diluted; it is rarely employed.

Ammoniæ Liquor Fortior, D. *Stronger Water of Ammonia.*

Preparation.—Heat a mixture of sal ammoniac and slaked lime, in the proportions used for aqua ammoniæ, and pass the product through aqua ammoniæ f℥viij, keeping the latter cool; or pass the gas disengaged from sal ammoniac ℥viij, into distilled water f℥v, keeping the receiver cool.

Dens. ·900. Used for smelling bottles, and to prepare liquor ammonia when diluted with water.

Linimentum Ammoniæ, D. L. E. *Liniment of Ammonia.*

Preparation.—D. Solution of ammonia f℥j, olive oil f℥iij; mix.

L. and E. Solution of ammonia f℥j, olive oil f℥ij; mix.

An imperfect ammonical soap, generally known as hartshorn and oil; used to relieve rheumatic and other pains, for sore throats, &c., applied on flannel or with friction.

Linimentum Ammoniæ Compositum, E. *Compound Liniment of Ammonia.*

Preparation.—Stronger aqua ammoniæ, dens. ·880, f℥v, tincture of camphor f℥ij, spirit of rosemary f℥j; it may be made weaker with tincture of camphor f℥iij, and spirit of rosemary f℥ij.

More stimulant than the plain liniment; when applied for a few minutes on flannel it reddens the skin; a longer application vesicates.

Gondret's Ammoniacal Ointment. *Preparation.*—Melt lard ʒvij, oil of almonds fʒiss, in a wide mouthed bottle with a glass stopper; add strong aqua ammoniæ fʒv or vj, and shake together; it should be kept cool; when rubbed on the skin it irritates, and if covered by a compress of flannel, blisters in about ten minutes.

Tinctura Ammoniæ Composita, L. *Compound Tincture of Ammonia.*

Preparation.—Macerate mastic ʒij, in rectified spirit fʒix; pour off the clear solution; add oil of lavender min xiv, oil of amber min iv, stronger solution of ammonia Oj, and shake together.

Called eau de luce; it is seldom used, but is antispasmodic.

Dose.—Gtt x to xxx, in a glass of water.

Spiritus Ammoniæ, E. *Spirit of Ammonia.*

Preparation.—Slake lime ℥xij, with water f℥viss; mix with powdered muriate of ammonia ℥viij, and place all in a glass retort; heat it and pass the gas to the bottom of a bottle containing rectified spirit Oij, but capable of holding half as much more, and keep it cool as long as gas is disengaged.

The spiritus ammoniæ, L. contains carbonate of ammonia; this preparation does not effervesce with acids, and is more caustic. It is used to make the following preparations:—

Spiritus Ammoniæ Aromaticus, D. E. *Aromatic Spirit of Ammonia.*

Preparation.—D. Rectified spirit Oiij, oil of lemon, f℥ss, oil of nutmeg fʒij, of cinnamon fʒss, dissolve and add stronger solution of ammonia f℥vi ; mix and filter. Dens. ·852.

E. Spirit of ammonia f℥viij, oil of lemon peel fʒj, oil of rosemary fʒiss ; dissolve.

Dose.—Gtt xx to ʒiss, in sufficient fluid.

Spiritus Ammoniæ Fœtidus, D. E. *Fetid Spirit of Ammonia.*

Preparation.—D. Assafœtida in small bits ℥iss, rectified spirit Oiss, macerate twenty-four hours ; distil off the entire of the spirit and add stronger solution of ammonia f℥iij. Dens. ·849.

E. Assafœtida in fragments ℥ss, digest with spirit of ammonia, f℥xss, for twelve hours, then distil f℥xss, by a vapour bath heat.

Dose.—Gtt xx to fʒiss in sufficient fluid to dilute its caustic taste ; for remarks see the corresponding preparations of L.

AMMONIÆ CARBONAS, (NH_3CO_2.)

Carbonate of Ammonia.

This can only be formed by combining dry ammoniacal gas, and carbonic acid ; they produce a white, pungent powder, soluble in water ; it is not employed medically. Several other combinations of carbonic acid and ammonia are known ; Rose has described twelve compounds, but the following are alone of medical utility :—

AMMONIÆ SESQUICARBONAS, D. L. AMMONIÆ CARBONAS, E. *Sesquicarbonate of Ammonia.*

($2NH_4O,+3CO_2$) or ($2AD.H_2O+3.CO_2$.Kane.)

This substance, popularly known as smelling or volatile salts, is procured in white, fibrous, transparent cakes, having a sharp ammoniacal taste, and pungent odour ; it dissolves in four parts of cold water, by boiling water or alcohol it is decomposed, evolving carbonic acid and ammonia ; when exposed to air, it changes into a soft, white powder, which is much less pungent, and consists of bicarbonate of ammonia ; by washing with a small quantity of cold water, the sesquicarbonate can be converted or separated into two salts, a carbonate composed of NH_3CO_2, which dissolves ; and an hydrated bicarbonate which remains, in hard crystalline grains of weak odour, faintly alkaline and resembling the bicarbonate of potash ; its composition is NH_4O,CO_2+HO,CO_2.

Preparation.—L. E. Hydrochlorate of ammonia ℔j, chalk ℔iss; powder each separately, mix and sublime with a gradually increasing heat.

D. An article of materia medica, to be brought prepared.

Ammonia, derived from the hydrochlorate of ammonia, combined with carbonic acid of the chalk, sublimes as carbonate of ammonia, taking with it hydrogen from the hydrochloric acid, and oxygen from the lime, as water; and the chlorine and calcium remain as chloride of calcium in the retort; but during this process, ammonia is set free from one part of the salt, leaving its carbonic acid, it takes one part of water and escapes in vapour; hence the reaction is, $3NH_3HCl$ and $3CaO,CO_2$ form $2NH_3,HO+3CO_2$; NH_3HO ; and $3\ CaCl$; sesquicarbonate of ammonia resulting instead of a neutral carbonate. The salt is now usually made in manufactories from rough ammoniacal compounds procured in gas houses; the impure sulphate or hydrochlorate of ammonia thus obtained, being heated with chalk in iron retorts; it affords a very impure product, which must be re-sublimed for use.

In general it is sufficiently pure; if prepared from gas water, it may contain some empyreumatic substances, and will then give dark coloured solutions if mixed with dilute acids; it should be translucent, and totally sublimed by heat; any dry white powder on it, like efflorescence, being the bicarbonate.

USES.—Similar to liquor ammonia to which it is preferred for internal use being less caustic; as an antacid it is seldom employed; Bouchardat strongly recommends it in full doses for diabetes, given in solution or mixed with treacle, forming bolusses; along with this he directs gluten bread, wines, and abstinence from food containing starch; from ℈j to ʒss of it dissolved in water, acts as a speedy, stimulating emetic, useful in poisoning by narcotics, or the latter stages of suffocative catarrh; it enters into the saturated saline mixture which contains ʒj of carbonate, converted into citrate of ammonia, by saturation with lemon juice f℥ij to iij, to which water and syrup are added to make f℥viij. Its effects are diaphoretic and slightly stimulating, and its activity may be increased by adding antimonial solution f℥ss, or aromatic spirit of ammonia fʒiij; dose f℥ss, every three or four hours; ammonia is less used than potash or soda for effervescing draughts, twenty grains are neutralized by lemon juice fʒvj, or citric or tartaric acid gr. xxvj, which are the proportions for effervescing mixtures.

DOSE.—Gr. v to x in pills or solution as a stimulant and sudorific; gr. xx to xxx as an emetic.

Aqua Ammoniæ Carbonatis, E. *Liquor Ammoniæ Sesquicarbonatis*, L. *Solution of Sesquicarbonate of Ammonia.*

Preparation.—Sesquicarbonate of ammonia ℥iv, distilled water Oj, dissolve and filter.

Exposed to the air it looses its pungency, and forms bicarbonate of ammonia. *Dose.*—fʒss to fʒjss diluted.

Linimentum Ammoniæ Sesquicarbonatis, L. *Liniment of Sesquicarbonate of Ammonia.*

Preparation.—Solution of sesquicarbonate of ammonia f℥j; olive oil f℥iij, mix.

It forms an imperfect soap, similar in use and properties to the linimentum ammoniæ before described.

Spiritus Ammoniæ, L. *Spirit of Ammonia.*

Preparation.—Hydrochlorate of ammonia ℥x, carbonate of potash ℥xvj, rectified spirit Oiij, water Oiij; mix and distil Oiij.

In this process chloride of potassium remains in the retort, carbonate of ammonia distills over, is partly dissolved in the spirit, and in part falls undissolved and imperfectly crystallized; this solution is rarely employed.

Dose.—fʒss to fʒj.

Spiritus Ammoniæ Aromaticus, L. *Aromatic Spirit of Ammonia.*

Preparation,—Hydrochlorate of ammonia ℥v, carbonate of potash ℥viij, cinnamon bruised ʒij, cloves ʒij, lemon peel ℥iv, rectified spirit Oiv, water Oiv; distil Ovj.

From its agreeable taste, this preparation is usually employed in hysteria, nervous affections, and all cases in which the stimulating effects of ammonia are desired. *Dose.*—fʒss to fʒiss sufficiently diluted.

Spiritus Ammoniæ fœtidus, L, *Fetid Spirit of Ammonia.*

Preparation.—Made by adding assafœtida ℥v, to the ingredients of the spirit of ammonia before distilling.

It is rarely employed; when freshly made it is colourless, but becomes brown by keeping. *Dose.*—fʒss to fʒj diluted; in hysteria.

The preparations of the same names as the three preceding, of D. and E. are described under liquor ammoniæ; being solutions of the gas in spirit, not of the carbonate.

AMMONIÆ BICARBONAS, D. $(NH_3,2CO_2+Aq.)$

Bicarbonate of Ammonia.

Preparation.—Powder sesquicarbonate of ammonia, spread it on a sheet of paper and expose it to the air for twenty-four hours; keep it in a stoppered bottle.

It is usually in fine white powder, less soluble than the sesquicarbonate, requiring eight parts of water to dissolve it, its odour and taste are faintly alkaline; it can also be obtained in right rhombic prisms; this bicarbonate forms whenever the common carbonate is kept in an imperfectly closed vessel.

TESTS.—Its solution does not affect the chloride of barium or of calcium, until by exposure to air it evolves carbonic acid, when white precipitates occur.

USES.—It is seldom employed, but may be used in effervescing solutions; or as an antacid.

DOSE.—Gr. v to xv in cold water.

LIQUOR AMMONIÆ ACETATIS. D. L. AQUA AMMONIÆ ACETATIS, E.

Solution of Acetate of Ammonia.

The acetated water of ammonia, or spirit of Mindererus, is a colourless fluid, having a faint odour, and only slight taste; if quite neutral it does not affect test paper, but a little excess of acid is usually preferred; by evaporating the solution in an air pump, crystals of the salt may be obtained, they are very deliquescent.

Preparation.—D. Dilute acetic acid Oiij, to this gradually add in a bottle, sesquicarbonate of ammonia ℥iiss, or sufficient to saturate it; and dissolve it without heat. Dens. 1012.

L. Distilled vinegar, Oiv, add sesquicarbonate of ammonia ℥ivss, or sufficient to saturate it.

E. Distilled vinegar of dens. 1005, (from French vinegar is preferred,) f℥xxiv, carbonate of ammonia ℥j; mix, and if any bitterness remains add more vinegar; its dens. should be 1011.

Carbonic acid escapes with effervescence from the carbonate of ammonia, and the acetic acid combining with the ammonia, forms an acetate in the solution.

IMPURITIES.—Rarely important; its strength may vary from using different kinds of vinegar, or from want of care in preparing it; any colouring in it is caused by impure vinegar or ammonia.

TESTS.—Concentrated and heated with sulphuric acid, it disengages the odour of acetic acid; if heated with potash, ammonia is evolved.

USES.—Externally it is often employed as a lotion to inflamed parts, diluted with an equal quantity of water, to this ether or muriate of ammonia may be added to form an evaporating or refrigerating lotion; in weaker solutions as f℥iv, with rose or elderflower water f℥iv, it is employed as a collyrium in ophthalmic affections.

Internally, it is prescribed in most febrile attacks as a diaphoretic, and nitre or tartar emetic are usually conjoined to increase its activity, which is not very great; the surface of the body should at the same time be kept warm, for all saline diaphoretics are liable to act as diuretics if this is neglected; formerly it was made of vinegar and spirit of hartshorn, the oily empyreumatic impurities of which considerably increased its efficacy, although its taste was much more disagreeable.

DOSE.—f℥ss to f℥iss every three or four hours.

AMMONIÆ MURIAS, D. E.
AMMONIÆ HYDROCHLORAS, L. (NH_3,HCl.)
Muriate or Hydrochlorate of Ammonia.

A substance called sal ammoniac has been long known, but some consider the ancients meant rock salt by this term; Geber was acquainted with our sal ammoniac; its name is derived from the district where the temple of Jupiter Ammon stood in Lybia, and for a long time Europe was supplied through Egypt with this salt, sublimed from burning dung. In commerce it is found in large hemispherical cakes, translucent and odourless, of a sharp saline taste; if exposed to the air it becomes moist; when heated it sublimes unchanged; it dissolves in three parts of cold, or one of boiling water, causing cold during its solution; it also dissolves in five parts of alcohol, and from solution or sublimation it may be got in distinct crystals; it is difficult to pulverize from its tenacity. According to Kane, it a chloramidide of hydrogen, or HCl,HAd. Berzelius considered it a chloride of the metal ammonium, Cl,NH_4.

Preparation.—It is made from the impure ammoniacal liquid of the gas works; this contains carbonate, sulphate, hydrosulphate and hydrocyanate of ammonia; on adding sulphuric acid, nearly all these are converted into sulphate of ammonia, which by evaporation is obtained in impure brown crystals; when mixed with chloride of sodium, and strongly heated in iron pots with leaden tops, the crystals decompose, muriate of ammonia subliming, and sulphate of soda remaining in the vessel; NH_4O,SO_3; and NaCl, producing NH_4Cl; and NaO,SO_3. It is also procured during the preparation of animal charcoal. After boiling the bones to remove their fat, they are placed in an iron retort and strongly heated; gasses escape from them, and a quantity of brown ammoniacal liquid termed bone spirit, mixed with animal oil, distils over; the substance remaining in the retort is removed while hot, in air tight canisters, and when cold, ground and sold as ivory black; from the bone spirit, sal ammoniac is made in the same manner as from gas liquid; the ammonia is derived in this process from the gelatinous portions of the bone, decomposing by heat.

TESTS.—Mixed with caustic potash, it evolves ammonia; and when dissolved in water, nitrate of silver produces with it a white precipitate of chloride of silver.

IMPURITIES.—From being sublimed into leaden receivers, the outer part of the cake may contain lead, this is usually scraped off; if any remain, sulphuretted hydrogen will give a black precipitate with it in solution; yellow streaks are sometimes found on the salt arising from iron, (Pereira,) which forming a double chloride of ammonia and iron, requires nitric acid to be added before testing with yellow prussiate of potash, which then forms prussian blue.

USES.—It is employed in lotions from the cold produced during its solution; the only way of obtaining this object is, by directing the solid muriate of ammonia to be added to water, in the vessel in which it is to be used, and the lotion employed as it dissolves; or more intense cold may be obtained, by mixing equal parts of nitre and of this salt in three parts of water, which lowers the temperature 40°; these applications are used in inflammations of the brain, and sometimes to aid the reduction of hernia and for recent sprains; muriate of ammonia ℥ss to ℥j, dissolved in water f℥viij, acts as a stimulating lotion, and is employed for contusions and ecchymoses, chilblains, chronic tumors, &c., the skin must be unbroken when this wash is used; sometimes a stronger solution is preferred, to which spirit of wine may be added; weaker solutions are used for gargles in cynanche tonsillaris, and for washes to scabies, and indolent ulcers. Internally it is not much employed in this country; in Germany it is considered a powerful alterative, hence they prescribe it in chronic inflammations of the lungs, liver, uterus, spleen, &c.; and for many diseases in which mercury or iodide of potassium are used with us, as scrofulous affections, and to disperse tumors. A plaster made of muriate of ammonia in powder ʒss, soap ʒij, lead plaster ʒiv, has been advised for rheumatic pains and pulmonary affections, it disengages gaseous ammonia which acts as an irritant and rubefacient, it must be freshly made and applied every day.

DOSE.—Gr v to xxx in powder, in aromatic infusion with syrup.

CALCIUM. (CA,=20.)

Calcium, the metallic base of lime, was discovered by Sir H. Davy; it is a brilliant white metal, heavier than water, which it decomposes, disengaging hydrogen, and forming lime by uniting with the oxygen of the water; combined with carbonic acid it constitutes marble, limestone, and chalk; and it is found in all hard waters, the carbonic acid contained in the water holding it dissolved; gypsum or plaster of Paris is its sulphate, and lime salts are almost invariably a constituent of plants, while shells are formed of carbonate, and bones contain phosphate of lime.

CALX RECENS USTA, D. CALX, L. E. (CaO,=28.)

Quick Lime.

Quick lime if pure, is white, but usually has a greyish colour; its taste is acrid, and it reacts strongly alkaline; when exposed to the air it absorbs water and carbonic acid; if water is poured on quick lime it is absorbed, in a short time the lime cracks, falls into fine powder and disengages heat, so as to vaporize much of the water and be capable of inflaming wood, a hydrate of lime CaO,HO being formed; this slaked lime is sparingly soluble, but it is remarkable that hot water dissolves less of it than cold; a pint of water at 32° holding in solution gr. xiij; at 60° gr. xiss; and at 212° only gr. viss.

Preparation.—L. Break chalk ℔j in fragments, and heat for one hour in a strong fire.

E. Heat fragments of white marble in a covered crucible for three hours, or till it gives no effervescence with muriatic acid, when slaked and suspended in water.

It is usually procured from limestone heated in kilns, and although not so pure as that obtained from white marble, its adulterations do not interfere with its medical effects.

TESTS.—In solution, lime gives a white precipitate with carbonate of soda, and is not affected by sulphuretted hydrogen, shewing it to be an alkaline earth; it is distinguished from the other alkaline earths, barytes, strontian and magnesia, by oxalic acid producing a white precipitate, not dissolved by excess of acid; sulphates do not precipitate lime water.

PURITY.—"Muriatic acid should dissolve it totally, without effervescence; and the solution does not precipitate with ammonia." E.

USES.—To prepare lime and potash waters, and potassa cum calce; it may be employed as a caustic, but is rarely used; in a few instances quick lime has been eaten, and produced such symptoms as might be expected from its acridity; lime is employed in most *depilatories*, or powders to remove superfluous hair; Rayer directs for this purpose, lime ℥j, carbonate of potash ℥ij, and charcoal ʒj; Plenck's paste is composed of lime twelve parts, orpiment one part, starch ten parts; it is applied in a paste with warm water, and washed off when dry. Lime water may be given as an antidode in poisoning with oxalic acid, but a mixture of magnesia or chalk is preferable, as water dissolves too little lime; it has been recommended in poisoning with arsenic as a chemical antidote; with emetics, and mixed with oil in a thick emulsion, it is at least useful to envelope the poison and diminish its absorption. In dyspeptic affections with irritability of stomach and acidity, lime water is employed mixed with milk which disguises its taste, and affords some nutrition, when ordinary food is not borne; for dysentery and chronic diarrhœa, lime water has frequently been used with benefit, it corrects any acidity which might keep up irritation, and has considerable astringing effect over the mucous secretion.

Liquor Calcis, D. L. *Aqua Calcis,* E. *Lime Water.*

Preparation.—D. Fresh burned lime ℥ij, distilled water cong. ss, slake the lime with f℥iss, and place it in a stoppered bottle with the rest of the water; then shake for five minutes; after twelve hours the excess of the lime will have subsided, and the clear fluid may be drawn off as required; when used it may be renewed three or four times, by shaking the sediment with more water.

L. Lime ℔ss, slake and add distilled water Oxij, shake and set by for three or four hours; afterwards keep it with the rest of the lime in stoppered glass vessels, and use the clear solution.

E. To one part of lime, add twenty parts of water; and as the clear lime water is used, replace it by fresh water.

Lime water is colourless, and has an acrid alkaline taste; when exposed to the air it rapidly absorbs carbonic acid, forming insoluble carbonate of lime, which deposits as a white crust. *Dose.*—f℥ss to f℥viij three or four times daily.

Linimentum Calcis, D. E. *Liniment of Lime Water, or Carron Oil.*

Preparation.—D. Lime water, olive oil, of each equal measures; mix together.

E. Lime water and linseed oil, of each equal quantities; mix.

It forms an imperfect soap used for burns and scalds, called Carron oil, from being first employed at the Carron iron works; oil of turpentine is sometimes added to it.

Ostermaier's Cement for the Teeth.

Take finely powdered caustic lime thirteen parts, anhydrous phosphoric acid twelve parts, mix and introduce into the carious tooth; it becomes solid in about two minutes.

CALCII CHLORIDUM, D. L. CALCIS MURIAS, E.
($CaCl$,=56.) *Chloride of Calcium.*

This substance, also termed muriate of lime, is found in small quantity in sea water, and some mineral springs; pure anhydrous chloride of calcium is white, transparent and crystalline; it can also be procured in striated, rhombic prisms, containing six atoms of water: it dissolves in one-fourth its weight of water at 60°, and produces great cold, if mixed with ice forming a powerful freezing mixture; at a red heat it fuses, and becoming phosphorescent, is called Homberg's pyrophorus.

Preparation.—D. Pure muriatic acid Oiiss, distilled water Ovj, mix and gradually add chalk in fragments ℔ij; when effervescence ceases, boil for ten minutes, add now, stirring well, a very slight excess of slacked lime, and throw all on a calico filter; acidulate the filtered solution with a few drops of muriatic acid, evaporate to dryness, and expose the residue, to a low red heat in a Hessian crucible; finally powder the product rapidly in a warm mortar, and enclose it in a stoppered bottle.

L. Hydrochloric acid Oss, water Oss, mix and add gradually chalk ℥v, or to saturation; when effervescence ceases, strain and evaporate to dryness; fuse the salt in a crucible, and pour it on a flat clean stone, when cold, break it in pieces, and keep in a closed bottle.

E. Muriatic acid Oj, water Oj; mix and add white marble ℥x in fragments, by degrees; when effervescence ceases, add a little marble in fine powder, till the liquid no longer reddens litmus; filter, concentrate to one half, and put it in a cool place to crystallize; keep the crystals in a well closed bottle; more may be got by concentrating the mother liquid.

The chlorine of the hydrochloric acid unites with the calcium of the lime, and forms chloride of calcium; the oxygen of the lime, and hydrogen of the acid, produce water; and carbonic acid escapes in effervescence, CaO,CO_2 and HCl. form Ca,Cl; HO and CO_2.

TESTS.—Nitrate of silver gives a white precipitate of chloride, soluble in ammonia, and insoluble in nitric acid.

PURITY.—"It should be colourless, semi-transparent, hard, and totally soluble in water; giving no precipitates with ammonia, chloride of barium, or yellow prussiate of potash, L." shewing the absence of magnesia, alkaline sulphates, or iron. "The crystals are extremely deliquescent, seventy-six grains in distilled water f℥j, precipitated by forty-nine grains of oxalate of ammonia, is precipitable by more of the test. E." This detects any alkaline salt.

USES.—It was much prescribed as a stimulant and alterative in scrofulous affections, glandular enlargements, tabes mesenterica, &c; but is now nearly disused. The fused salt, is employed to abstract moisture, dry gasses, &c. for chemical purposes, and with ice to form freezing mixtures; it enters into the composition of some factitious mineral waters.

Calcii Chloridi Liquor, D. L. *Solutio Calcis Muriatis*, E.
Solution of Chloride of Calcium.

Preparation.—D. Chloride of calcium ℥iij, distilled water f℥xij; dissolve and filter through paper. Den. 1225.

L. Chloride of calcium ℥iv, distilled water f℥xij; dissolve.

E. Crystallized muriate of lime ℥viij, water f℥xij; dissolve.

Dose.—fʒss to fʒiss, diluted with water.

CALX CHLORINATA, D. L. E. *Chloride of Lime.*

Bleaching powder was patented by Mr. Tennant, in 1798; it is a white or greyish powder, having a feeble smell of hypochlorous acid; bitter and acrid to the taste; usually it contains a quantity of hydrate of lime, which remains when the bleaching powder is dissolved in water; it requires about ten parts of water to dissolve in, the solution is highly alkaline, and has slight bleaching powers, if an acid be added, it bleaches powerfully; exposed to the air, chloride of lime, gradually absorbs carbonic acid, and chlorine escaping, carbonate of lime, mixed with deliquescent chloride of calcium remains, forming a damp mass.

Preparation.—E. Pass chlorine, evolved from hydrochloric acid and binoxide of manganese, through hydrate of lime ℔j, in a proper vessel until saturated.

For commerce it is made on a large scale; the chlorine is formed in leaden vessels from peroxide of manganese, salt and sulphuric acid; and conveyed into a room built of sandstone, containing slaked lime spread on wooden trays, piled over each other; occasionally the lime is agitated, and in about four days the process is finished. Most good specimens of chloride of lime do not yield above thirty parts of chlorine in every 100 parts, and contain about eighteen parts of unchanged hydrate of lime.

THEORIES.—The composition of bleaching powder is still unsettled; Millon considers it of similar composition to peroxide of calcium, an atom of chlorine replacing one of oxygen, Ca,O,Cl.

Ballard considers it a compound of hypochlorite of lime and chloride of calcium; if so, Kane remarks, it must be a double salt. $CaO,ClO+CaCl$.

PURITY.—"It should be greyish white and dry; fifty grains are nearly dissolved by distilled water f℥ij, the solution is of dens. 1027. 100 measures of it, with excess of oxalic acid, gives off much chlorine; and boiled, yields after twenty-four hours rest, enough precipitate to occupy nineteen measures of the liquid. E." This is oxalate of lime. To determine its bleaching power, Dr. Ure directs gr. x to be put into the closed end of a bent tube filled with mercury, and hydrochloric acid passed up, chlorine gas is formed, which expels the mercury from the open end of the tube, and is prevented acting on the metal by the solution of chloride of calcium formed between the gas and it; at least three or four cubic inches of chlorine should be obtained, equal to twenty or thirty per cent by weight, and the gas should be all soluble in the mercury by agitation, any that is not so dissolved consisting of carbonic acid.

EFFECTS.—Internally, a solution of chloride of lime is used in gangrene of the lungs, to correct the fœtor, and has been said to check the disease; in dysentery, it is also employed, and it is recommended as an antidote in poisoning by sulphuretted hydrogen, sulphuret of potash, or prussic acid. Its chief use is as a disinfecting agent; it destroys the odour of sulphuretted hydrogen and of ammonia, decomposing these offensive gasses produced during animal and vegetable decay; the other odorous products of rotting substances are generally considered to be also decomposed, but Piorry, thinks their smell is merely overpowered by the chlorine; in medicine, from this property, lotions containing it are directed in gangrene, or when the discharge from wounds, ulcers or compound fractures is offensive and fetid; it benefits by destroying the irritating products of decay, and also by its stimulating effects, inducing more healthy action and improved secretion; for this purpose, the solution of chloride of lime is diluted with six to thirty parts of water, and used as a wash, or applied with poultices steeped in it. In dysentery, some chloride of lime placed in the bed vessel, is often employed to remove the offensive odour of the evacuations; but the power of destroying smell, appears to be distinct from that of preventing infection, and there is no evidence that any disinfecting agent yet recommended can do this. Pereira states he has met no facts to satisfy him that it can destroy the infection of fever; Bousquet diluted vaccine lymph with chloride of soda, and it was still infectious, and chlorine has often failed in checking cholera and erysipelas; it is therefore a question whether the employment of chloride of lime in sick rooms, by destroying odour, does not conceal the lurking places of infection, leading to false security, and neglect in the attendants removing all filthy substances as soon as possible; the odour of chloride of lime which is more offensive to some, than even that of putrefaction, is also objected to. Until we know more of the chemical nature of infecting matter, it will be impossible to propose chemical substances to decompose it; animal in its production, it probably has vitality, perhaps of low character, but sufficient to live until it meets proper soil in another body to develope the disease; and as heat destroys life, and heat has been found to destroy the risk of infection more certainly than any chemical preparation, it should be employed with all substances capable of communicating disease, in preference to the nostrums so much praised at the present day. For purulent ophthalmia a solution of ℈j to ʒij of chloride of lime, in water f℥j, has been advised, dropped into the eye; for scabies and itchy eruptions, an ointment of ʒj to an ounce of lard, or a strong solution in water, has been used; lozenges containing it are employed to whiten the teeth and check fœtor of the breath, or a tooth powder made of one part chloride of lime, with five parts of chalk and fifteen of powdered myrrh, may be used for the same purpose; it may also be prescribed in gargles for diseases of the tongue or throat, or in excessive salivation, but Soubeiran states that it destroys the perception of taste for some hours.

DOSE.—Gr. ij to x dissolved in water or some aromatic infusion, and filtered.

Calcis Chlorinatæ Liquor, D. *Solution of Chloride of Lime.*

Preparation.—Chlorinated lime ℔ss, water cong. ss; mix well in a large mortar, and transfer to a stoppered bottle; shake frequently during three hours; filter through calico, and keep the solution in a stoppered bottle. Dens. 1035.

The filtering removes undissolved hydrate of lime; for internal use, it must be largely diluted with water.

Dose.—Gtt. xx to fʒj; for gargles fʒij to iv, mixed with f℥viij of fluid.

CALCIS CARBONAS. (CaO,CO_2=50.)

Carbonate of Lime.

This substance is extensively diffused; it constitutes immense beds of rocks, forming the vast deposits of limestone and chalk which abound in fossil organic remains; many of the more recent rocks also, as oolite and marl, are chiefly composed of carbonate of lime; in a crystalline state, it produces the numerous distinct varieties of calcareous spar; the shells of the crustacea and mollusca, and part of the bones of animals consist of carbonate of lime, and it is found in the ashes of vegetables; in hard waters it is held dissolved by carbonic acid, and deposited on boiling; the varieties of it employed medically are marble and chalk.

Marmor, D. L. E. *Marble.*—Is used to prepare carbonic acid; white statuary marble is preferred, being pure limestone, and containing no iron or other impurities; it should be totally soluble in acids.

Creta, *Calcis Carbonas Friabilis*, D. L. E. *Chalk.*—Is found in large quantity in the south of England; it is dull white, tasteless, and friable; whiting is chalk ground in a mill and mixed with water, the finer sediment which subsides after separating the coarse impurities being dried into cakes.

Creta Præparata, D. L. E. *Prepared Chalk.*

Preparation.—D. Take chalk ℔j, reduce it to a fine powder, mix it with water in a large mortar to the consistence of cream; fill the mortar with water and stir well, giving it a circular motion; let it stand fifteen seconds, and decant the milky liquid into a large vessel; triturate what remains in the mortar, adding as much water as previously used; let it settle fifteen seconds, again decant, and repeat the process several times; let the fine sediment which subsides from the decanted liquids be transferred to a calico filter, and dried at a heat not above 212°.

L. and E give similar directions. L. states that oyster shells may be prepared in the same manner.

Calcis Carbonas Præcipitatus, D. *Precipitated Chalk.*

Preparation.—Take chloride of calcium ℥v, crystals of carbonate of soda ℥xiij; dissolve each in boiling water Oij; mix, and when the precipitate subsides, draw off the supernatant liquor; place the sediment on a calico filter, and wash it with boiling distilled water till the washings cease to precipitate with nitrate of silver; then dry the product at a heat not above 212°.

PURITY—Chalk is nearly insoluble, one part requiring 1600 of water to dissolve it; in hydrochloric acid it should be perfectly soluble, and should give no precipitate with sulphate of lime, showing the absence of barytes and strontian; any part insoluble in acid is silica. "Twenty-five grains of chalk dissolved in f℥x pyroligneous acid, neutralized by carbonate of soda, and precipitated by thirty-two grains of oxalate of ammonia, should precipitate with more of the test. E." This shows the quantity of lime in it, if there be ninety per cent of pure carbonate it gives a second precipitate.

USES.—Prepared chalk is used, suspended in water, as a chemical antidote for oxalic acid, and the strong mineral acids. In diarrhœa, chalk mixture is much employed, it neutralizes acidity, and has distinct astringent powers; aromatics, the stronger vegetable astringents, and preparations of opium are often added to it, its excessive and prolonged administration is however liable to cause concretions in the bowels; as an antacid it is seldom employed, for this purpose carrara water, an ærated solution of bicarbonate of lime, has been lately recommended, but all calcareous waters ought to be avoided by persons liable to urinary deposits of oxalates or phosphates. Chalk is sometimes dusted in excoriations, ulcers, and burns, to absorb the discharge and diminish its quantity. Precipitated chalk is used for tooth-powder, but is too soft, its whiteness causes it to be preferred to prepared chalk, equal parts of both mixed, and one-eighth part of powdered camphor added, forms a good dentifrice; for internal use it is inferior to prepared chalk.

DOSE.—Gr. x to ʒiss, in powder, or suspended in mixture.

Mistura Cretæ, D. L. E. *Chalk Mixture.*

Preparation.—D. Prepared chalk ʒij, mix with cinnamon water f℥vij, add syrup f℥ss, mucilage of gum arabic f℥ss.

L. Prepared chalk ℥ss, refined sugar ʒiij, mixture of acacia f℥iss, cinnamon water f℥xviij; mix.

E. Prepared chalk ʒx, pure sugar ʒv, mucilage f℥iij, spirit of cinnamon f℥ij, water Oij; mix.

Used in diarrhœa, and to correct acidity of the stomach; tincture of kino, or catechu, aromatics, and opium, are often added to it.

Dose.—f℥ss to f℥ij.

Pulvis Cretæ Compositus, D. L. E. *Compound Chalk Powder.*

Preparation.—D. Prepared chalk ℥v, cinnamon ℥iiss, gum arabic ℥ij, nutmeg ʒss; powder separately, mix and pass through a fine sieve.

E. Chalk ℥iv, cinnamon in powder ʒiss, nutmeg in powder ʒj; mix.

L. Prepared chalk ℔ss, cinnamon ℥iv, tormentil root ℥iij, gum arabic ℥iij, long pepper ℥ss; powder and mix.

An aromatic antacid and astringent, frequently used for children.

Dose.—Gr, x to xxx.

Trochisci Cretæ, E. *Chalk Lozenges.*

Preparation.— Prepared chalk ℥iv, gum arabic ℥j, nutmeg ʒj, sugar ℥vj; form with water into lozenges.

A mild antacid and astringent.

CALCIS PHOSPHAS PRECIPITATUM, D.

($8CaO+3PO_5$.) *Precipitated Phosphate of Lime.*

Preparation.—D. Take ox bones burned to whiteness in a clear fire ℥iv, powder and digest in pure muriatic acid f℥vj, diluted with distilled water Oj; to the solution filtered, if necessary, add distilled water Oj, and then solution of ammonia f℥xj, or sufficient to render it alkaline; collect the precipitate on a calico filter, and wash with boiling distilled water, as long as the liquid which passes through precipitates with a solution of nitrate of silver, acidulated with nitric acid; dry the washed product by exposing it for some days on porous bricks to a warm atmosphere.

Bone, or sub-phosphate of lime, is a white powder without taste or smell, insoluble in water; it was formerly employed in medicine for rickets and mollities ossium, with the view of affording bone earth to the bones, but is now rarely prescribed.

DOSE.—Gr. x to xxx.

MAGNESIUM. (Mg,=12.)

The metallic base of magnesia is obtained by decomposing chloride of magnesium by potassium with heat; it is a white metal, oxidizing in damp air, and if heated to redness, it burns brilliantly, forming the earth magnesia; in sea water it is found as a chloride. Magnesia constitutes part of many minerals, as mica, talc, and steatite; a hydrate of it is found native, and the magnesian limestone, or dolomite, forms large masses of rock; magnesia is also procured in the ashes of some plants, in urine, and some calculous concretions.

MAGNESIA, D. L. E. (MgO,=20.)

Calcined magnesia is a fine light powder of white colour, odourless, and without taste, reacting alkaline when moistened; it is very insoluble, taking 5142 parts of cold, or 36,000 parts of hot water to dissolve it; exposed to air, it slowly absorbs carbonic acid, and when mixed with water, it does not evolve heat like lime, but absorbs about eighteen per cent of the water.

Preparation.—Take carbonate of magnesia, any quantity, expose it in a crucible to a full red heat for two hours, or till the powder suspended in water does not effervesce with muriatic acid; preserve it in closed bottles.

D. employs a low red heat, and tests with dilute sulphuric acid.

By heat, the carbonate is converted into earthy oxide of magnesium, carbonic acid being driven off; MgO,CO_2, forming MgO, and CO_2.

PURITY.—"Gr. 50, should be entirely soluble without effervescence in muriatic acid, f℥j; an excess of ammonia added, causes only a scanty precipitate of alumina; the filtered fluid is not precipitated by oxalate of ammonia, E." shewing the absence of lime. Usually magnesia effervesces with acids, for if the heat used in preparing it be not strong enough, some carbonate remains undecomposed, and this is often preferred to the risk of applying a strong heat, which would partially fuse the magnesia, and form gritty lumps.

TESTS.—Magnesia in solution does not give a precipitate with sulphuretted hydrogen, and a white precipitate is produced by carbonate of soda, shewing the presence of an alkaline earth. It is known to be magnesia by solution of phosphate of soda, with ammonia added to it, causing a white deposit, the ammoniaco phosphate of magnesia; sulphuric acid or a sulphate does not affect magnesia, which distinguishes it from lime, barytes, and strontian, the other alkaline earths.

EFFECTS.—It is employed as an antacid, and being less likely to derange the stomach than the alkalies, is used for heartburn and in lithic acid deposits, which it checks, but if long continued, it may, like other alkaline remedies cause phosphatic deposits. In large doses it acts as a laxative, this is most evident when there is excess of acid in the stomach, and probably is due to the saline compounds thus formed; Paris considers it a stimulant to the muscular fibres of the intestines; its continued exhibition is objectionable from its liability to accumulate in the bowels and form concretions, sometimes of enormous size; one has formed weighing 5℔. For children it is an excellent laxative, easily taken, being tasteless, and certain in its action from the acidity usually present in their stomachs, while it is at the same time sufficiently mild. Taylor particularly advises magnesia as the antidote to oxalic acid; it may also be used in poisoning by the strong mineral acids, but as when added to these it causes heat, it ought to be largely diluted with fluid, which also has the beneficial effect of diminishing their corrosive action.

DOSE.—As an antacid, gr. x to xxx; as a purgative, ℈j to ʒiss; for infants, gr. ij to x; it may be given in milk, or combined with other purgatives, as rhubarb or sulphate of magnesia in some aromatic water, or with colchicum wine in gouty attacks.

Henry's Calcined Magnesia is a patent medicine ; it does not appear to differ in any respect from the ponderous calcined magnesia sold in shops, and which is prepared by calcining the ponderous carbonate of magnesia ; it is stated, a similar substance can be made by forming common carbonate of magnesia into cakes with a little water, drying these in a stove, placing them in crucibles, and calcining in the ordinary manner, probably with a very strong heat.

MAGNESIÆ CARBONAS, D. L. E.

($MgO,HO+3MgO,CO_2HO$. or $4MgO,3CO_2+4Aq$.)

Carbonate of Magnesia.

This was prepared for sale by the Count di Palma in Rome, early in the eighteenth century ; in a native state it forms a range of hills in Hindostan, and is procured in masses in various localities ; it is sold as a very light, white powder, inodorous and almost tasteless, nearly insoluble in water, and having a weak alkaline reaction.

Preparation.—D. Sulphate of magnesia ℥x, crystals of carbonate of soda ℥xij, dissolve each in cold distilled water Oiv, mix and boil for ten minutes ; place the precipitate on a calico filter, and pour on it repeatedly boiling water, until the washings cease to precipitate with nitrate of barytes, then dry by a heat not exceeding 212°.

L. E. Dissolve sulphate of magnesia ℔iv, and carbonate of soda ℔iv ℥viij, each separately in distilled water, cong. ij ; mix and boil for fifteen or twenty minutes, stirring briskly ; collect and wash the precipitate and dry it.

In this process double decomposition occurs ; sulphuric acid unites with the soda, forming sulphate of soda which continues in solution, three-fourths of the carbonic acid uniting with the magnesia precipitates, and the other fourth escapes, the magnesia at the same time taking 4HO. $4NaO,CO_2$ and $4MgO,SO_3$ form $4MgO,3CO_2+4Aq$. CO_2 passes off, and $4NaO,SO_3$ dissolves.

Much of the common magnesia is made in Scotland, it is said from the residue of sea water after evaporating out the common salt, and when damp it is often pressed into cubic masses, its powder is very light, forty-eight grains filling an ℥j measure ; its taste is sometimes disagreeable from containing sulphate of soda from imperfect washing.

ADULTERATIONS.—Any lime is detected by dissolving the carbonate of magnesia in nitric acid, oxalate of ammonia then gives a white precipitate of oxalate of lime ; if magnesia is boiled in water, the filtered solution should not give precipitates with chloride of barium or nitrate of silver, shewing the absence of alkaline sulphates, carbonates, or chlorides; 100 parts dissolved in dilute sulphuric acid, lose 36·6 parts by weight from escape of carbonic acid.

TESTS.—It is known to be a carbonate by effervescing with dilute acids.

USES.—The same as calcined magnesia; sometimes it is given in effervescence as a laxative, gr. xiv require lemon juice fʒiijss, or citric acid gr. xx, to neutralize it.

DOSE.—Gr. v to xxx as an antacid; ℈j to ʒiss as a purgative; in electuary, milk, or some aromatic water.

MAGNESIÆ CARBONAS PONDEROSUM, D.

Heavy Carbonate of Magnesia.

Preparation.—Dissolve sulphate of magnesia ℥x, in boiling distilled water Oss. and crystals of carbonate of soda ℥xij, in boiling distilled water Oj; mix the solutions, and evaporate to dryness by a sand heat; digest the residue for half an hour with boiling distilled water Oij, collect the insoluble part on a calico filter, wash it repeatedly with boiling distilled water, till the washings cease to precipitate with a solution of nitrate of barytes, and dry it at a heat not above 212°.

A heavy carbonate of magnesia has been much employed in medicine, a formula is now given for preparing it; as usually sold, about 160 grains fill an ℥j measure; its doses and effects are similar to the ordinary carbonate to which it is preferable in prescribing.

Trochisci Magnesiæ, E. *Magnesia Lozenges.*

Preparation.—Carbonate of magnesia ℥vj, pure sugar ℥iij, nutmegs ℈ij, with mucilage of tragacanth form into lozenges.

Used to correct acidity of the stomach.

BICARBONAS MAGNESIÆ, *Bicarbonate of Magnesia.*

Carbonate of magnesia is disolved in considerable quantity when carbonic acid is passed into water, in which the carbonate is suspended, particularly if done under pressure; Kane states the compositon of the dissolved salt is MgO,CO_2+3Aq. The solution is a clear fluid of slightly alkaline taste, it is sold as *Murray's fluid magnesia;* a similar preparation is made by Mr. Dinneford and others. Sir James Murray's afforded gr. xiij of magnesia in f℥j. Dinneford's gr. xviiss, but these solutions may vary in the quantity of magnesia held dissolved; when exposed to the air they loose carbonic acid, and a crystallized carbonate of magnesia is deposited in the bottles. Their strength or the amount of magnesia in them is ascertained by evaporating f℥j to dryness, calcining the residue, dissolving out any soluble impurities and weighing the insoluble part; every five grains of it are equal to twelve grains of the common carbonate.

USES.—It acts as a pleasant and effective antacid; and as a purgative, if acid be present in the stomach, or if taken in effervescence; an acidulated syrup containing citric acid is usually sold for this purpose; occasionally, an extemporaneous solution of bicarbonate of magnesia is formed, by mixing 123 parts of sulphate of magnesia, with 144 parts of carbonate of soda, each dissolved in water, but it contains sulphate of soda as well, which render the taste disagreeable.

DOSE.—As an antacid f℥ss to f℥j; as an aperient f℥j to ij.

MAGNESIÆ SULPHAS, D. L. E. ($MgO,SO_3+7Aq=123.$)

Sulphate of Magnesia.

Sulphate of magnesia is usually termed Epsom salt, from being discovered in a spring at Epsom, in 1765; it is contained in sea water, and enters into the composition of some minerals and mineral waters. Epsom salt has a bitter, nauseous, saline taste, it is sold in small acicular crystals, but may be got in quadrangular prisms, modifications of the right rhombic system, which are colourless and transparent, and should slightly effloresce in the air; when heated it melts, abandoning six atoms of water, and fuses into an enamel, but is undecomposed by a strong heat; it dissolves in its own weight of cold, or three-fourths of boiling water, and is insoluble in alcohol.

Preparation.—The sulphate of magnesia is made by calcining dolomite, or magnesian limestone; to this, which forms caustic lime and magnesia, sulphuric acid is added, and sulphates of lime and magnesia are obtained; the sparingly soluble sulphate of lime is separated, by dissolving out the soluble sulphate of magnesia, which is purified by evaporating and crystallizing; or the calcined magnesian limestone may be acted on by hydrochloric acid, enough being added to convert only the lime into chloride, which is easily washed out; the remaining magnesia is then converted by sulphuric acid into Epsom salt, and crytallized.

From bittern, or the residue of sea water after separating its common salt, which contains chloride and sulphate of magnesia, Epsom salt is obtained by evaporating and crystallizing; sometimes sulphuric acid is added to decompose the chloride, and form more sulphate of magnesia; the crystals first deposited, called single Epsom salt, are impure; when dissolved and recrystallized, a purer Epsom salt, termed double, is obtained; the brine that has yielded 100 tons of common salt will give four or five of sulphate of magnesia.

TESTS.—It is known to be a sulphate, by giving a white precipitate with salts of barytes, insoluble in acids.

IMPURITIES.—In general, Epsom salt is sufficiently pure for use; when made from bittern it may contain some chloride of magnesia, which by attracting moisture renders the salt damp. "It is readily soluble in water; sulphuric acid added to a solution does not expel any hydrochloric acid; (shewing the absence of chlorides.) 100 grains of it, dissolved and mixed with a boiling solution of carbonate of soda, should give gr. xxxiv of carbonate of magnesia, when dried. L." If this is not obtained, the adulteration may be suspected of sulphate of soda. "Ten grains dissolved in f℥j of water, and treated with a solution of carbonate of ammonia, is not entirely precipitated by 280 minims of solution of phosphate of soda. E." A little magnesia remains in the fluid if the salt is pure.

USES.—It is a certain saline purgative of mild and safe action, not likely to gripe, and from its cheapness generally employed, but its unpleasant taste is objectionable; as this is disguised by sulphate of iron; a salt has been lately prepared containing it, named the ferro-sulphate of magnesia, the iron is however liable to disagree in many instances where the pure salt is useful. There are few diseases where purgatives are necessary that sulphate of magnesia may not be used with benefit, particularly in febrile and inflammatory affections; it is generally prescribed with infusion of senna, or dissolved in water, to which some aromatic may be added; as its cathartic effects are increased by dilution, a smaller dose will suffice if taken in a sufficient quantity of fluid; the acid infusion of roses conceals its taste in some degree, forming a good vehicle for its exhibition, and in dyspeptic affections, the bitter infusions are often combined with it. Epsom salt is frequently used for purgative enemas; and is found in most of the purging saline mineral waters. In poisoning by barytes, or the salts of lead, sulphate of magnesia may be employed as an antidote, forming with them insoluble and inert sulphates; like most purgative saline preparations, if given in over large quantity, and in a strong solution, it may cause all the symptoms of irritant poisoning, and even death; thus, an old man has died with violent purging from its effects, in twenty-four hours.

Dose.—ʒiv to ℥j is the ordinary dose; if largely diluted, or for delicate persons, ʒiss to iij acts sufficiently; to enemas ℥j is usually added.

Pulvis Salinus Compositus, E. *Compound Saline Powder.*

Preparation.—Pure muriate of soda ℥iv, sulphate of magnesia ℥iv, sulphate of potash ℥iij; dry the salts with a gentle heat, powder and mix well; keep in closed bottles.

A mild saline aperient, dose ʒij to iij in half a pint of water.

Tasteless Magnesian Aperient.

Preparation.—Heavy carbonate of magnesia one part, dried Epsom salt two parts, dried Rochelle salt two parts, candied sugar one part, bicarbonate of soda one part and a half; dry each separately, and reduce to fine powder, mix and add gtt xv oil of lemon to every ℔j; then add dry tartaric acid in fine powder one part and a half; and preserve in closed bottles.

Dose.—ʒj to iv, taken in effervescence in water, forms an agreeable aperient; it is a good substitute for the patent preparation called Moxon's magnesia, and may be used whenever a cooling, antacid purgative is of benefit.

BARIUM. (Ba,=69.)

Barium is a metal of the colour of silver, it decomposes water, disengaging hydrogen gas and forming barytes, the oxide of the metal; this is a greyish powder, of caustic taste and alkaline reaction, dens. about 4·7; insoluble in alcohol, it rapidly combines with water, evolving much heat, and forming a hydrate, which is dissolved by two parts of boiling, or twenty of cold water.

Tests.—Barytes is detected by its soluble compounds giving with carbonate of soda a white precipitate of carbonate of barytes; and with sulphuric acid or the soluble sulphates a white deposit of sulphate of barytes, not dissolved by nitric or muriatic acid.

BARYTÆ SULPHAS, D. E. ($BaO,SO_3=117.$)

Sulphate of Barytes.

Sulphate of barytes, also known as heavy spar, was discovered by Scheele and Gahn, in 1774. It it is found crystallized and in masses, often in union with metallic ores; if pure it is colourless, of dens. 4·4, to 4·8, tasteless and odourless; it is difficult to fuse, but can be melted into a white enamel, and is insoluble in all acids except boiling vitriol, in which it dissolves sparingly. It is used to form other preparations of barytes, and in commerce, to adulterate white lead; the common calamine consists almost entirely sulphate of barytes; it has no medical properties.

BARYTÆ CARBONAS. D. L. E. ($BaO,CO_2=99.$)

Carbonate of Barytes.

When occurring native, this substance is termed witherite, from its discoverer, Dr. Withering; it is found in masses or crystals in many lead mines, and is common in Lancashire; it is very insoluble, requiring 4300 parts of cold, or 2300 of boiling water for solution, but is more soluble in water containing carbonic acid; its dens. is 4·3; if artificially made, it forms a white tasteless powder.

Preparation.—The native carbonate is usually sufficiently pure for use; a pure carbonate may be got by decomposing chloride of barium, with either carbonate of ammonia or of soda, washing the precipitate and drying it.

TESTS.—It is known to be a carbonate by effervescing with dilute acids, carbonic acid escaping.

PURITY.—"100 grains dissolved in excess of nitric acid, are not entirely precipitated by sixty-one grains of anhydrous sulphate of magnesia; E." or 125 grains of crystallized sulphate. It should be "totally soluble in dilute hydrochloric acid, on adding ammonia or hydrosulphuric acid there is no precipitate, and the solution remains colourless; when more sulphuric acid is added than is necessary to saturation, nothing is afterwards thrown down by carbonate of soda, L." Any sulphate of barytes present will not be dissolved in hydrochloric acid; a precipitate with ammonia would show alumina; and sulphuretted hydrogen would deposit lead, copper, or iron; if the carbonate of soda gives a precipitate, lime is present.

USE.—To prepare the chloride of barium. Carbonate of barytes is poisonous though insoluble, ʒj is said to have proved fatal, but a young woman has recovered after taking half a tea-cupful of it; she suffered severely for a time, had dimness of vision, headache, palpitations of the heart, cramps and vomiting.

ANTIDOTES.—The sulphate of magnesia, or of soda, which form insoluble sulphate of barytes.

BARII CHLORIDUM. D. L. BARYTÆ MURIAS, E.

$BaCl + 2Aq = 123$. *Chloride of Barium.*

Chloride of barium was discovered by Scheele in 1775: it is procured in colourless, transparent, rhombic plates or tables, of a disagreeable bitter taste, efflorescing in very dry air: Dens. 2·82; 100 parts of cold water dissolve 43·5 of the crystals, in strong alcohol they are said to be insoluble.

Preparation.—D. Pure muriatic acid f℥viij, distilled water Oiss, mix and add carbonate of barytes in coarse powder ℥x, when effervescence ceases, evaporate to dryness; expose the residue in a Hessian crucible to a low red heat for 20 minutes, when cool, coarsely powder and boil it for 10 minutes with distilled water Oiss, pour off the solution and boil the residue with f℥x more water; again decant, filter the solution through paper, evaporate to about f℥xiv, and let it cool that crystals may form; the mother liquid by evaporating and cooling will yield more crystals. Or, Heat sulphate of barytes ℔iss, in a covered crucible, when red hot, throw it into distilled water, and after reducing it to a fine powder, (as directed in the formula for creta preparata,) mix it intimately with lamp-black ℥iv, and expose for two hours in a Hessian crucible, to a strong red heat; remove the crucible, let its contents cool, coarsely powder them, and boil for 15 minutes in distilled water Oiv, filter through paper; boil the residue again in distilled water Oij, and strain through the same filter; to the filtered solution, placed in a large capsule beneath a flue with a good draught, gradually add pure muriatic acid f℥xiv, or as long as it causes effervescence, and then with a sand heat evaporate to dryness; boil the residue with water Oiv, filter through paper, evaporate to Oij, and let it cool that crystals may form; more may be got by concentrating the mother liquid.

L. Mix hydrochloric acid Oss, distilled water Oij, add carbonate of barytes in small fragments ℥x; heat, and when effervescence subsides, boil down that crystals may form.

E. Directs the same process to be followed as L. Or heat sulphate of barytes ℔ij, to redness, and finely powder it; when cold, mix well with charcoal, in fine powder ℥iv; heat in a covered crucible for three hours, at a low white heat, then pulverize the product; add it gradually to boiling water Ov, boil for a few minutes, let it rest over a vapour bath for a little, and filter the clear liquor, keeping it hot; pour boiling water Oiij on the residue, filter this, and mix the two solutions, add to them while hot, pure muriatic acid, as long as there is effervescence. In this process, the solutions should be exposed as little as possible to air, and in the last step, the gas that escapes should be discharged by a proper tube, into a chimney or the ash-pit of a furnace; then strain, concentrate, and crystallize the solution.

When hydrochloric acid acts on carbonate of barytes, carbonic acid escapes with effervescence; water is formed from the hydrogen of the acid uniting with the oxygen of the barytes; while chlorine and barium, uniting with two atoms of water, crystallizes. BaO,CO_2 ; HCl, and 2Aqua, form HO ; CO_2, and $BaCl+2Aq$.

By heating sulphate of barytes with charcoal the oxygen of both the sulphuric acid and barytes, uniting with carbon, is evolved as carbonic oxide, and escapes; the residue consists of sulphuret of barium, which is dissolved in water, and decomposed by hydrochloric acid; the sulphur of the sulphuret, uniting with hydrogen of the acid, produces sulphuretted hydrogen gas; the barium combining with chlorine, to form chloride of barium. BaO,SO_3, and $4C,=4CO$, and BaS, which by HCl is converted into HS, and $BaCl$.

TESTS.—Being a chloride, it gives a white precipitate with nitrate of silver, soluble in ammonia, and insoluble in nitric acid; if burned with spirit of wine, it causes a greenish yellow flame, peculiar to barytic salts.

PURITY.—Usually free from adulteration; if it becomes moist in the air, the presence of chloride of calcium or strontian, may be suspected. "Ninety grains in solution acidulated with nitric acid, are not entirely precipitated by ninety grains of crystallized sulphate of magnesia. E."

USES.—Formerly much employed in the treatment of scrofulous affections, painful and lupoid ulcerations, glandular swellings, and strumous ophthalmia; in moderate doses it is said to be tonic and alterative, in larger quantity it produces vomiting, purging, giddiness, and debility; ℥ss has proved fatal in two hours, and ℥j, in one hour; causing convulsions and paralysis. For medical use, the solution is prescribed.

ANTIDOTES.—Sulphates of soda or magnesia, or alum in solution, to form an insoluble sulphate of barytes; emetics should then be given to discharge the poison, but unless speedily administered, antidotes are not likely to be of use from the rapid action of the salts of barytes.

Barii Chloridi Liquor, D. L. *Solutio Barytæ Muriatis*, E.
Solution of Chloride of Barium.

Preparation.—D. Chloride of barium ℥j, distilled water f℥viij; dissolve and filter. Dens. 1088.

L. E. Chloride of barium ʒj, distilled water f℥j; dissolve and filter.

Dose.—Gtt v, gradually increased to gtt xv, or until nausea or giddiness is produced; used also as a test for sulphuric acid and sulphates.

BARYTÆ NITRAS, E. ($BaO,NO_5=131.$)

Nitrate of Barytes.

This is prepared like chloride of barium, substituting nitric for muriatic acid; it forms octohedral crystals, soluble in twelve parts of cold, or four of boiling water; when heated, it decrepitates, then decomposes, and leaves a residue of pure baryta; it is used as a test for sulphates, for which a solution is ordered.

Solutio Barytæ Nitratis, E. *Solution of Nitrate of Barytes.*

Preparation.—Nitrate of barytes 40 grains, distilled water 800 grains; dissolve and keep in closed bottles.

ALUMINUM. ($Al,=13{\cdot}7.$)

Aluminum was procured by Wohler in 1828; it is a greyish metal, of dens. 2·6, which slowly decomposes water, and combined with oxygen, forms alumina, Al_2O_3; this earth, in general united with silica, constitutes the great bulk of the various kinds of clay, and is found in almost all rocks, except pure limestone; the ruby and sapphire are composed of alumina, with a little colouring matter, emery is a coarser variety of this earth, and all porcelain and earthenware chiefly consist of it.

Preparation.—Alumina may be obtained by adding ammonia in excess to a solution of alum, when a white gelatinous hydrate of alumina precipitates; if dried, and strongly heated, this becomes pure alumina.

It is a white tasteless mass, little acted on by acids; it absorbs and retains much moisture.

TESTS.—Alumina in solution, produces with hydrosulphuret of ammonia, a white precipitate of alumina; and with carbonate of soda or of potash, a white precipitate, soluble in the caustic fixed alkalies, but not in ammonia; if moistened with a solution of nitrate of cobalt, and heated before the blowpipe, it forms an azure coloured bead.

ALUMEN, D.L.E. SULPHAS ALUMINÆ ET POTASSÆ.

($Al_2O_3,3SO_3.\ KO,SO_3+24\ Aq.$) *Alum.*

The term alum was probably applied to many substances by the ancients, and some consider our alum was not discovered until the eighth or twelfth century; the first alum works known to Europeans, was at Rocca or Edessa, in Syria, whence the term rochealum is derived; in the reign of Elizabeth it was made at Whitby in Yorkshire. Alum is transparent, without odour or colour, of an astringent sweetish taste, reacting as an acid; it forms regular octohedral crystals, but is usually sold in large crystalline masses, its dens. is 1·7; it dissolves in eighteen parts of water at 60°, or three-fourths its weight of boiling water; in dry air it slightly effloresces; the substance commonly termed roche alum, is composed of fragments the size of almonds, coloured externally with armenian bole or rose pink; if alum is heated, it loses forty-five per cent of water, and forms a white spongy mass, named burnt alum.

Preparation.—It is made from shale or alum slate, containing coally matter, and instable rhombic crystals of iron pyrites; exposed to the air, or in some places roasted, the sulphur of the pyrites absorbs oxygen and becomes sulphuric acid, which combines partly with the iron and in part with the alumina, forming sulphate of iron and sulphate of alumina, these are dissolved by washing and the sulphate of iron crystallized out; a quantity of sulphate of potash is then added, which unites with the sulphate of alumina, forming the double salt alum; or chloride of potassium, procured from the waste liquid of soap boilers, may be employed instead of sulphate of potash; it decomposes the sulphate of iron, and thus forms a sulphate of potash, which combines with the alum, and a chloride of iron that remains in solution.

TESTS.—It is known to be a sulphate, by chloride of barium giving a white precipitate insoluble in acids; the tests for alumina are already described.

PURITY.—Iron is sometimes present, tincture of nut galls will then produce with it a blueish black colour; this adulteration is not important medicinally, but is injurious in some manufactures; the alum of commerce frequently contains ammonia.

USES.—A strong solution of alum is employed as a styptic in epistaxis, by injecting the nostrils, or plugging them with lint dipped in it; to check hœmorrhage from wounds, hœmorrhoids or leech bites, a similar solution may be used, and a sponge saturated with it is occasionally introduced into the vagina to arrest uterine bleeding. In the purulent ophthalmia of infants, a lotion composed of alum ʒj to iv, dissolved in water Oj, is often beneficial; and sometimes for ordinary ophthalmia, an alum wash is prescribed in the earliest stages, with the intention of suddenly checking it; this may frequently succeed, but if not, it is liable to increase the inflammatory symptoms; when the disease becomes chronic, such a lotion is frequently of service. Alum enters into the composition of astringent gargles used for relaxed sore throat, or to check salivation, and in the form of injection it is employed for gleet or leucorrhœa; in lead colic alum is considered by some as a specific, and given in doses of ℈j to ʒij, every three or four hours, it is said to mitigate pain, and relax the bowels; opium is often combined with it, and Dr. Copland advises the addition of camphor; the effects of the alum are accounted for by others on chemical views, by decomposing the lead salt, they suppose it forms an insoluble sulphate; Dr. Copland is of opinion, it operates by exciting the action of the partially paralyzed muscular fibres of the intestine, enabling them to expel any morbid matters. Large doses of alum are administered with benefit in pyrosis, and it has been used in chronic diarrhœa, hœmoptysis, menorrhagia, and hæmaturia. Brettoneau recommended its application to the false membrane in diphtherite, by blowing finely powdered alum through a tube into the throat, and Velpeau has used it in a similar manner in the sore throat of scarlatina and measles.

DOSE.—Gr. x to xxx in powder or solution; as much as ʒij to iij, has been given in twenty-four hours, when sufficiently diluted; as vegetable astringents decompose alum, and probably diminish its astringency, they should not be prescribed with it. Alum whey is occasionally employed, it is prepared by boiling milk Oj, adding alum ʒij, and straining off the curd, a wine glass-ful of the whey is taken for a dose. Solutions of alum for external use are made of various strengths, from gr. j or ij to f℥j of water, as a weak astringent lotion, to a saturated solution which checks hœmorrhage; for gargles, ʒj is usually added to infusion of roses, or decoction of barley f℥x.

Alumen Siccatum, D. *Alumen Exsiccatum*, L. E. *Burnt Alum.*

Preparation.—Melt alum in a porcelain capsule (or iron pot, E.), over a gas lamp or open fire, and heat until vapours cease to be disengaged; powder and keep it in a stoppered bottle.

The water is driven off from the alum, but excessive heat should be avoided, which would expel some of the acid.

It is used as an escharotic to exuberant granulations.

Pulvis Aluminis Compositus, E. *Compound Alum Powder.*

Preparation.—Alum ℥iv, kino ℥j; powder and mix.

Used as an astringent in chronic diarrhœa, to check some hæmorrhages, and occasionally applied to flabby ulcers. *Dose.*—Gr. x to xx, in powder.

Liquor Aluminis Compositus, L. *Compound Solution of Alum, or Bates's Alum Water.*

Preparation.—Alum ℥j, sulphate of zinc. ℥j, boiling water Oiij ; dissolve and strain.

This is sometimes employed much diluted, as an astringent lotion, or as an injection for gleet, &c.

Cataplasma Aluminis, Ph. D. 1826. *Alum Poultice.*

Preparation.—Take the whites of two eggs, alum ʒj ; mix.

Applied to the eye, between folds of linen, in purulent ophthalmia, and useful in allaying the dangerous irritation sometimes produced by the local employment of corrosive sublimate.

ARSENICUM. (As,=75·3.) *Arsenic.*

Arsenic is a brilliant, steel grey metal, crystalline and very brittle, of dens. 5·9 ; it sublimes at 356°, without previously fusing, and its vapour on becoming oxidized, has a strong garlic odour ; if exposed to the air, arsenic is gradually converted into a grey suboxide, termed fly powder, which is considered by some as a mere mixture of the metal and arsenious acid ; it also forms two definite compounds with oxygen, AsO_3, arsenious acid, and AsO_5, arsenic acid. Arsenic is occasionally found native, or united with sulphur forming orpiment and realgar, but usually it is in combination with other metals, as cobalt, nickel, and copper ; by roasting these, arsenious acid is separated, and the metal arsenic can be procured from it.

Arsenicum Purum, D. *Pure Arsenic.*

Preparation.—Take commercial white oxide of arsenic ʒij, place it at the sealed end of a hard German glass tube, of about half an inch in diameter, and eighteen inches long, and having covered it with about eight inches of dry and coarsely pulverized charcoal, and raised the portion of the tube containing the charcoal to a red heat, let a few ignited coals be placed beneath the oxide so as to effect its slow sublimation ; when this is done, the metallic arsenic will be found attached to the interior of the tube, at its distant or cool extremity. In this process the furnace should be that used in performing organic analysis, and the fuel ignited charcoal ; the open extremity of the tube should be connected with a flue, to prevent the possible escape into the room of arsenical vapours ; and with the view of keeping it from being plugged by the metal, an iron wire should be introduced occasionally into it, through a cork fixed (but not air tight) in its open extremity.

Used in preparing the liquor arsenici et hydrargyri hydriodatis. D.

ACIDUM ARSENIOSUM, D. L. ARSENICUM ALBUM, E. (AsO_3=99.) *White Arsenic.*

Arsenious acid, or the white oxide of arsenic, has been long known; it is found, though rarely, in a native form, and is usually obtained from the ores of arsenical iron or cobalt, by roasting them in a furnace, which oxidizes the arsenic and volatilizes it; the vapours gradually cool, depositing arsenious acid in the chambers of a long horizontal chimney, divided by several partitions; it is still impure and of a greyish colour, requiring to be refined by sublimation, by which it is condensed as a heavy glassy looking mass, termed glacial arsenious acid; when recently made, these cakes are transparent, but soon become opaque, white, and sometimes easily reduced to powder; the alteration appears due to the acid slightly absorbing water, its surface first changing, and then gradually becoming opaque towards the centre; the density of the two varieties are different:—

The transparent,	3·74	Kane and Guibourt,	3·71	Phillips,	3·79	Taylor.
The opaque,	3·69	,, ,,	3·62	,,	3·62	,,

Guibourt states, that the glacial acid dissolves in 103 parts of water, at 59°, or in 9·33 parts, at 212°, and the opaque acid in 80 parts of water at 59°, or 7·72 parts, at 212°; according to Kane a hundred parts of boiling water dissolves 9·68 parts of the transparent, or 11·47 parts of the opaque acid; Mr. Taylor asserts, both are equally soluble, that cold water remaining on arsenious acid for several hours, dissolves from the 500th to the 1000th part of its weight, or one-half to one grain in f℥j; hot water allowed to cool on it, takes up the 400th part, or one grain and a quarter in f℥j; and if boiled for one hour with the acid, and then cooled, it holds in solution a fortieth part, or about gr. xij in f℥j. Arsenious acid has no taste, or is slightly sweetish, when taken in small quantity, though Orfila states it is acrid and corrosive; if much of the acid is used in coarse powder, it may cause a decided taste on the tongue; by sublimation, it can be obtained in transparent octohedral crystals; the transparent acid is said to redden litmus, and the opaque to restore the blue colour of reddened litmus, but Pereira and Christison have found both to react acid.

Acidum Arseniosum Purum, D. *Pure Arsenious Acid.*

Preparation.—Take commercial white oxide of arsenic, any quantity, place it in a Florence flask, the neck of which is made to pass into that of a second flask of a larger size, and applying to the *former* a regulated heat, by suspending it beneath a semi-cylindric hood of sheet iron, a few inches above a small charcoal furnace, cause the arsenic to sublime into the *latter*; this should be done under a flue, with a good draught to protect the operator from inhaling any vapours which may escape being condensed.

Used to prepare liquor arsenicalis, D.

TESTS.—For identifying arsenious acid in its solid form, the following *Reduction Tests* are used:—

1st. Heated in a glass tube, it sublimes, and condenses in octohedral crystals, in the cool part of the tube.

2nd. Mixed with charcoal powder and heated in a small tube, metallic arsenic is sublimed, of steel grey colour, where it adheres to the glass, crystalline and dull inside; a tube one-eighth of an inch wide is sufficient, and a distinct sublimate may be procured from the 300th part of a grain.

3rd. On filing off the end of the tube, and gently heating the sublimate of metallic arsenic, it condenses higher up, in a crust of octohedral crystals of white arsenic, and an odour like garlic is perceived.

By want of care a crust of charcoal might be mistaken for arsenic, but it is dull looking, brown, and not volatilized by heat; a sublimate of mercury might also be confounded with arsenic, the aid of a magnifying glass shews this to consist, not of crystals but globules, which are easily made to run together.

For detecting arsenic in mixed fluids, Reinsch's and Marsh's Tests are employed.

Reinsch's Test, is boiling any solution suspected to contain arsenic, with about a tenth part of its bulk of hydrochloric acid, and slips of copper or fine copper gauze; the arsenious acid is decomposed, metallic arsenic being deposited as a thin steel grey crust on the copper, from which it may be separated by drying and heating the latter in a tube, when arsenic sublimes, either in the state of metal, or in octohedral crystals of its oxide, and by dissolving in water, a solution fit for applying the liquid tests is obtained. This process is so delicate, that it will give evidence of arsenic in a solution diluted with 90,000 times its weight of fluid, and is so simple and easy, as to be usually preferred to the other tests.

The errors in employing it are, that the muriatic acid may contain arsenic, this is obviated by boiling some of the acid with copper, before using it in the process; antimony, silver, mercury, bismuth, and some other metals, deposit crusts resembling arsenic on copper, these are at once distinguished by dissolving the crust in water, its solution will produce the proper reactions with the liquid tests, if arsenic be present.

Marsh's Test, is forming by means of zinc and sulphuric acid in a solution, hydrogen gas; it combines at the moment of its generation with any arsenic which is present, producing gaseous arseniuretted hydrogen; an apparatus is employed for this purpose, consisting of a tube shaped like a syphon, with a stopcock having a fine orifice, fitted on the shorter side where the zinc is placed, to permit the gas to collect for a time; the other end of the tube is open for adding sulphuric acid, and to allow the fluid to accumulate in it when expelled from the closed side; but a strong bottle answers very well, with a cork, having fixed into it a glass tube bent at a right angle, the end of which, distant from the bottle is drawn into a fine point. The gas as it escapes is set on fire, it burns with a blueish white light, producing a whitish smoke and a garlic odour; if a white saucer be held in the flame, a dark deposit of metallic arsenic forms on it; when held a short distance above the flame, a white crust of arsenious acid is produced; but if no arsenic is contained in the gas, when ignited it has a pale blue colour, is odourless, and only water is obtained by its combustion. The arseniuretted hydrogen is sometimes, instead of being inflamed, passed into a solution of nitrate of silver, which it decomposes, black metallic flocculi of silver being deposited, and arsenious acid forming in the solution; by precipitating the excess of nitrate of silver with hydrochloric acid and filtering, a clear liquid is then obtained, to which other re-agents can be applied.

This test is liable to fallacies, as the zinc or sulphuric acid employed may contain arsenic; and hydrogen with a solution containing antimony, produces a gas very like that formed with arsenious acid, and also decomposed by heat, giving a metallic crust, but the product is not volatile when heated, and is further distinguished by the liquid tests. Marsh's test is so delicate that it gives evidence of one grain of arsenic dissolved in 2,000,000 times its weight of water, and when diluted with 50,000 times its weight, the deposits, according to Mr. Taylor, are safely available. It is less employed than Reinsch's process, being more difficult to manage, and not so free from fallacies.

The Liquid Tests are used when a clear solution of arsenious acid is to be examined; they are—

1st. Sulphuretted hydrogen gas, passed into a solution of arsenious acid it produces a yellow precipitate of orpiment, which dissolves in ammonia, and again precipitates on adding an acid, it should be collected, mixed with charcoal, and heated in a small tube to procure metallic arsenic. The fallacies of this test are cadmium, persalts of tin, antimony and iron. Cadmium forms a yellow sulphuret like the sulphuret of arsenic, but insoluble in ammonia; the persalts of tin produce a yellow deposit of bisulphuret of tin; the precipitate from antimony is more orange coloured than that from arsenic; none of these, if collected, and heated, will afford a metallic sublimate. The antimonial precipitate is further distinguished by dissolving in muriatic acid, and on adding water to this solution a white powder falls, the oxide of antimony; persalts of iron with sulphuretted hydrogen, deposit sulphur, when heated this burns completely away.

2nd. Ammonio-sulphate of copper gives a pale green precipitate, Scheele's green, with arsenious acid; this may be confounded with many salts of copper, and always should be collected and reduced to obtain metallic arsenic. The test liquid is made, by adding carefully to a dilute solution of sulphate of copper, enough liquor ammonia to dissolve the oxide of copper first thrown down; but too much ammonia prevents its action on arsenic.

3rd. Ammonio-nitrate of silver, or Hume's test, forms with arsenious acid, a yellow deposit of arsenite of silver; it is very delicate, but much care is requisite in preparing the test liquid; to a solution of nitrate of silver, liquor ammonia is added, until the precipitate at first thrown down is nearly re-dissolved; if too little ammonia be employed it will precipitate phosphates, if too much, it will not act on arsenic; when rightly made this test is not subject to fallacy, otherwise, phosphate of soda might be mistaken for arsenic, this is however unchanged by heating, while the arsenical deposit decomposes, arsenic subliming, and metallic silver remaining behind.

When the fluid tests concur in producing evidence of arsenic there can be no doubt of its presence, but in every case it is preferable to procure the metal itself, which can be preserved and shewn as the best evidence of the poison.

ADULTERATIONS.—Chalk and sulphate of lime are sometimes mixed with powdered arsenious acid; these are detected "by heat, when the arsenious acid is entirely sublimed. E."

EFFECTS.—About one-fourth of all the deaths arising from poison in England occur from arsenic; when given in small frequently repeated doses it produces diarrhœa, nausea, irritability of stomach, wasting, debility, paralysis of the limbs, sometimes eruptions, loss of the hair and nails, gradual sinking, or delirium and death. In larger poisonous doses it causes great diversity of symptoms; they may be divided into three classes. 1st, Soon after taking it, there is nausea and vomiting with burning pain in the throat and stomach, which extends over the abdomen, and is followed by diarrhœa and tenesmus; after some time excessive depression arises, cold sweats, laborious breathing, a small weak pulse, and death usually occurs from twenty-four hours to three days. In the 2nd class, purging and vomiting may be absent or very slight; there is faintness, sometimes syncope, great prostration of strength, paralysis, and at times delirium; in most of these cases the dose of arsenic is very large, or it has been taken in small masses, and death commonly happens in a few hours. In the 3rd class, the primary effects are those of gastro-intestinal inflammation, vomiting, pain, purging, &c., to these succeed or are added symptoms of nervous derangement, varying from imperfect palsy to epileptic fits, mania or coma. Dr. Christison remarks that this form occurs when a small quantity has been taken, or the patient has soon vomited, and eventually recovers, or death may ensue, after a long illness. Death usually occurs from eighteen to twenty-four hours after taking arsenic; it has happened in three or four, rarely in two hours, and it may be deferred for ten or twelve days, or even longer. As arsenic kills from its constitutional action, no post mortem appearances are absolutely necessary, nor are they always met with when small doses are given; a larger quantity excites inflammation of the stomach and bowels, and ulcerations of the mucous membrane sometimes arise, where portions of arsenic lodge, but perforation of the stomach very rarely takes place; and gangrene is seldom seen, though an effusion of dark blood in the mucous tissue has often been mistaken for it. Even when applied to the body externally, arsenic has the power of inflaming the stomach.

Arsenic, when in considerable quantity, has a preservative effect on the animal tissues; hence the stomach and intestines of poisoned persons will often resist decay for months, and preserve their appearances sufficiently for legal proceedings. The arsenic however, found in the stomach after death is not that which has killed the person, but an excess over the poisonous dose; it is only in the tissues themselves that the very poison can be procured, and from those it may be obtained by Reinsch's process, and by others mentioned in works on jurisprudence; the quantity that is thus absorbed is small, and usually insufficient to preserve the tissues for any protracted time.

In medicine, arsenic is used internally for obstinate skin diseases, as lepra, psoriasis, and eczema, which it frequently removes without causing any other apparent effect, but it may produce loss of appetite, swelling of the face, itching of the eyelids, heat in the throat, and gastric pain; when these occur, its use must be suspended for a time. In chronic nervous diseases, as chorea, intermittent head aches, and some neuralgic affections, arsenic is sometimes found of service, and for chorea it is thought by some to be almost a specific, in tetanus, and epilepsy, it usually fails; in India it is considered a remedy for the bites of serpents. For intermittent diseases it has been much employed, the arsenical solution being well known as *Dr. Fowler's tasteless ague drop*, its cheapness is a recommendation, but quinine is usually preferred to this dangerous substance.

Used externally arsenic acts as a powerful caustic, gradually destroying the organization of the part it is applied to, and it may by becoming absorbed, produce symptoms of poisoning and death; in many quack remedies for cancer it constitutes the active ingredient of the paste or plaster, their use has therefore frequently led to dangerous accidents. Mr. Blackadder considered that in employing arsenic externally, small quantities are often absorbed, when a larger quantity quickly destroying the part, prevents absorption. It has been applied to lupoid ulcerations, hospital gangrene, malignant onychia, and ulcerations of the face, that resisting ordinary treatment, are frequently considered cancerous; its effects are sometimes exceedingly painful. The preparations for external use are the oxide of arsenic itself, this is very rarely employed, from the danger and pain attending its use.

Dupuytren's Powder.

Preparation.—White oxide of arsenic, gr. j, calomel, gr. 99; mix.

Sometimes the quantity of arsenic is increased to gr. ij, iv or even x; it is used, made into a paste with gum water, and ought not to be applied to more than the extent of a shilling at a time.

Sir A. Cooper's Ointment.

Preparation.—Arsenious acid ʒj, sulphur ʒj, spermaceti cerate ℥j, to be spread on lint, and applied for twenty-four hours.

Come's Powder, Cazenave.

Preparation.—Arsenious acid gr. x, red sulphuret of mercury gr. xxxx, powdered animal charcoal gr. x, mix with mucilage.

Mr Luke's Ointment for Onychia Maligna.

Preparation.—Arsenious acid gr. ij, spermaceti ointment ℥j, mix.

DOSE.—From one-sixteenth to one-eight of a grain in pills, to which opium may be added, but as they are liable to be carelessly prepared, pills are a bad form for exhibiting arsenic; it is safer to employ a solution such as liquor arsenicalis, which should be taken after meals, when it is less likely to disorder the stomach than if used fasting, if it should disagree, it must at once be discontinued, and it ought rarely to be administered beyond a week or two at a time, without some interval, to prevent its accumulating in the system. In doses of gr. ss, arsenic may cause symptoms of poisoning, and gr. ij to iij are considered to be a fatal dose, but usually in suicidal poisoning much more is taken, as ℥ss to ℥j.

ANTIDOTES.—Hydrated peroxide of iron is said to act as a chemical antidote, Mr. Taylor, however, states he has no confidence in it, except as far as it mechanically suspends the poison, and aids its ejection from the stomach; charcoal, magnesia, or any inert powder may be used with the same intention; Orfila recommends diuretics to remove the poison from the system, but it is during its passage through the body that arsenic does all the harm. Arsenious acid ought always to be discharged from the stomach as soon as possible by using the stomach pump, by tickling the fauces and by emetics, as sulphate of zinc ℈j, or a table-spoonful of mustard; as the poison is very dense, it is difficult to dislodge, adhering firmly to the mucous membrane, hence albumen, gruel, or oil and lime water, may be taken freely to suspend it, and again vomited; when inflammation arises, it must be treated in the usual manner.

Liquor Arsenicalis, D. E. *Liquor Potassæ Arsenitis*, L.
Arsenical or Fowler's Solution.

Preparation.—D. Place pure arsenious acid eighty-two grains, pure carbonate of potash eighty-two grains, in a flask with distilled water Oss, boil till perfectly dissolved, when cool, add compound tincture of lavender f℥ss, and as much distilled water as will make the bulk of the entire Oj, dens. 1013.

L. E. Arsenious acid in small fragments, (in powder, E.) carbonate of potash, of each eighty grains, boil with water Oss in a glass vessel till dissolved, when cool, add compound tincture of lavender ʒv, and enough water to make up Oj.

Each fʒj contains gr. ss, of arsenious acid, as arsenite of potash; the compound spirit of lavender is added for its flavour, and as a colouring matter, but as cochineal is employed instead of saunders wood in this spirit by D. the arsenic after a time completely bleaches the animal colouring material.

Dose.—Gtt v to x three times in the day with some aromatic water, as much as gtt xv to xx have been given, but it requires great care.

Deveryie's Arsenical Solution.

Preparation.—Oxide of arsenic gr. ij, carbonate of potash gr. ij, distilled water f℥xvss, cochineal ʒss, spirit of wine f℥ss. Each f℥j contains one-eight of a grain of arsenious acid.

Asiatic Pills.

Preparation.—Arsenious acid fifty-five grains, black pepper ℨix, gum arabic, enough to form 800 pills. Each pill contains about one fifteenth of a grain of arsenious acid, they are used in the east for syphilis, lepra, elephantiasis, &c. *Dose.*—One or two daily.

ARSENIC ACID. ($AsO_5=115.$)

Arsenic acid is highly poisonous, ; it is not employed medically ; this acid is formed by dissolving white oxide of arsenic in muriatic acid, and adding nitric acid as long as red fumes escape ; when evaporated, a white anhydrous mass remains, which slowly dissolves in water, producing a colourless, acid solution, from which deliquescent crystals of hydrated arsenic acid can be obtained.

TESTS.—Sulphuretted hydrogen forms with arsenic acid, a golden yellow precipitate ; nitrate of silver, a brick red arseniate of silver ; and with the reduction tests metallic arsenic is obtained.

ORPIMENT. ($AsS_3=123.$)

The yellow sulphuret of arsenic is found native, and prepared artificially for painting, by subliming sulphur mixed with arsenious acid ; thus obtained, it often has unchanged oxide of arsenic in it, of which Guibourt asserts it may contain ninety-four per cent, and is hence more dangerous than native orpiment ; with lime it constitutes King's yellow, a common paint ; orpiment is sometimes formed in the decaying bodies of persons poisoned with arsenic, from the action of sulphuretted hydrogen on the poison. It has been used in preparing some depilatories, but is not employed medically ; by reduction, metallic arsenic is easily procured from it.

A red bisulphuret of arsenic, AsS_2 or realgar, can be prepared by the chemist ; it is in red vitreous masses or in powder, and is employed for painting ; this bisulphuret has been occasionally used as a poison, and when the body is long buried, the realgar becomes changed into orpiment, by the gasses formed during putrefaction ; it is sometimes found as a mineral.

ARSENICI TERIODIDUM. ($AsI_3=453.$)

Teriodide of Arsenic.

Preparation.—Mix one part of powdered metallic arsenic, and five parts of iodine ; digest with water, fifty parts, until the iodine disappears ; on cooling, orange red crystals of iodide of arsenic separate. Or heat the arsenic and iodine together, and sublime the iodide carefully.

USED in various forms of chronic skin diseases and neuralgic affections.

DOSE.—One-tenth of a grain, gradually increased to the fourth of a grain. Biett uses an ointment of gr. ijss to lard ℥j, for lupoid diseases.

Arsenici et Hydrargyri Hydriodatis Liquor, D.
Solution of the Iodide of Mercury and Arsenic.

Preparation.—Rub together pure arsenic in fine powder six grains, pure mercury sixteen grains, pure iodine fifty grains and a half, alcohol fʒss, until a dry mass is obtained; and having triturated distilled water f℥viij with this, in successive portions, transfer the whole into a flask, and heat it until it begins to boil; when cooled and filtered, add as much distilled water as will make exactly f℥viij ʒvj.

This liquid is usually known as *Donovan's Solution*, from being introduced into practice by Mr. Donovan, of Clare-street; it is a pale greenish yellow fluid, without smell, and of a styptic taste; with preparations of opium or morphia it is incompatible, causing precipitates in them. The iodine is in combination with the metals, its quantity being sufficient to form a teriodide of arsenic, AsI_3, and to convert the mercury into an iodide, HgI; probably they then unite, producing a double iodide; fʒj of the solution contains equivalent to one-eight of a grain of arsenious acid, and to about one-fourth of a grain of oxide of mercury.

USES.—It is employed in obstinate skin diseases, and eruptions of the scalp; and a wash has been applied of it, in those affections, when diluted with water.

DOSE.—Gtt x to ʒss, three times in the day, in sufficient fluid.

STIBIUM. (SB,=129.) *Antimony*.

Antimony exists in nature in the form of oxide, termed white antimony; as sulphuret, the grey ore; and oxysulphuret, the red antimonial ore; metallic antimony is obtained from the sulphuret by fusing it with half its weight of fragments of iron, which removes the sulphur, forming sulphuret of iron, and the antimony then collects in the bottom of the crucible; or it may be procured by heating the sulphuret with black flux. It is a brittle, brilliant, white metal, of dens. 6·8, melting at 800°, and crystallizing in rhombohedrons; when strongly heated, and suddenly exposed to air, it burns with a white flame, forming clouds of oxide.

TESTS.—It produces with sulphuretted hydrogen, an orange red precipitate of sulphuret; and its solution in hydrochloric acid, added to excess of water, is decomposed, a white precipitate falling of oxychloride of antimony or powder of algaroth, which is dissolved by boiling with cream of tartar.

ANTIMONII SULPHURETUM, D. E. ANTIMONII SESQUISULPHURETUM, L. (SbS_3=177.)

Sulphuret of Antimony.

Black sulphuret of antimony is found as an ore in Cornwall, France, Borneo, &c., and is prepared for use by fusion in a furnace or crucible; the gangue or earthy substance remains, and the sulphuret melting out is cast into round masses, called loaves of crude antimony; when broken, these are striated and crystalline, of a dark steel grey colour; dens. 4·6; opaque, tasteless, brittle, and easily reduced to a black powder, but of a reddish black if the sulphuret is pure; it is less fusible than metallic antimony.

IMPURITIES.—Usually some sulphurets of iron, copper, arsenic, and lead; it is soluble in hydrochloric acid, which leaves any sulphuret of arsenic undissolved; by adding the acid solution to water, oxychloride of antimony is precipitated, and on filtering, the other adulterations are easily tested in the clear liquid that passes through the filter.

USED to procure the other antimonial preparations, and to make sulphuretted hydrogen; it is popularly employed in preparing decoction of sarsaparilla, the crude sulphuret tied in a fine cloth being boiled with the woods. Rayer considers its activity arises from arsenic accidentally contained in it, but soluble antimonial compounds may be formed sufficient to account for its effects.

Antimonii Sulphuretum Præparatum, D. *Prepared Sulphuret of Antimony.*

Preparation.—Take commercial sulphuret of antimony, powder it, and having separated the finer particles from the coarser, in the method explained for *Creta Præparata,* let them be dried and kept for use.

ANTIMONII TERCHLORIDI LIQUOR, D.

($SbCl_3$=237.) *Solution of Chloride of Antimony.*

The terchloride, or butter of antimony, when pure, is a deliquescent white mass like ice, but a liquid preparation of it is usually sold, which is coloured with pernitrate of iron, from a light amber hue to a deep red, and varies in dens. from 1·2 to 1·5; it fumes in the air, as it contains excess of muriatic acid.

Preparation.—Place prepared sulphuret of antimony ℔j, in a porcelain capsule; add commercial muriatic acid Oiv, and constantly stirring, gently heat the mixture beneath a flue with a good draught, the heat must be increased as the formation of the gas slackens, and finally carried to ebullition, and kept at this temperature for fifteen minutes; remove the vessel, and filter its liquid contents through calico, until a perfectly clear solution is obtained; transfer the liquid to another capsule; boil it down to Oij; when cool, keep it in a stoppered bottle. Dens. 1470.

In this process the sulphuret of antimony and hydrochloric acid decompose each other, forming sulphuretted hydrogen, which escapes, and a terchloride of antimony which remains in the solution; SbS_3+3HCl produce $SbCl_3$ and $3HS$.

TESTS.—When added to excess of water, muriatic acid is produced in the solution, and a white deposit of powder of algaroth falls, which is changed to an orange color by sulphuretted hydrogen showing the presence of antimony; nitrate of silver produces with the muriatic acid a white deposit of chloride of silver.

USES.—Being a powerful caustic, it is applied to phagedenic sores, ulcers of the throat, cancrum oris, and occasionally to the bites of rabid animals; the German surgeons have used it for staphyloma, painting the part with a camel's hair pencil dipped in it; as soon as a white crust appears, milk and water is washed over the place to prevent its excessive action. When employed, it at once decomposes, producing a slough, coloured white from oxide of antimony, and the hydrochloric acid formed at the same time, increases its activity as a caustic; the slough must afterwards be detached, and usually leaves a granulating surface. Cases of poisoning by it are recorded:—a surgeon took f℥iij, he felt excruciating pain, and suffered from prostration and coldness, after slight reaction, narcotic symptoms appeared, and he died in ten hours; from the mouth to the jejunum was blackened as if charred, and only the serous and submucous tissue remained uninjured.

ANTIDOTES.—Water or bland fluids, which decompose the poison; and, if possible, magnesia should be given.

ANTIMONII SULPHURETUM PRÆCIPITATUM, D. ANTIMONII SULPHURETUM AUREUM, E. ANTIMONII OXYSULPHURETUM, L.

Golden Sulphuret of Antimony.

This is a red or orange powder, without odour, and almost tasteless; insoluble in cold water; when heated, it burns with a blue flame, forming sulphurous acid, and leaving the oxidized metal.

Preparation.—D. Take prepared sulphuret of antimony ℥v, carbonate of potash, from pearl ash, dried at a low red heat, and in powder, ℥iv; mix, and heat cautiously, in a Hessian crucible, till effervescence ceases, then to low redness, until melted; pour out the mass on a clean flag, and when it has concreted and cooled, finely powder it in a porcelain mortar; add this in successive portions to water cong. j, while boiling in an iron vessel; having maintained the ebullition for twenty minutes, place the whole on a calico filter, and let the solution which passes through, drop into distilled water Oij, previously mixed with pure sulphuric acid f℥ij; collect the precipitate that forms, on a calico filter, and pour warm distilled water repeatedly on it, till the liquid which passes through ceases to precipitate with nitrate of barytes; finally, dry the product on warm bricks, in a warm atmosphere.

L. Mix sesquisulphuret of antimony ℥vij, solution of potash Oiv, distilled water cong. ij, and boil with a slow fire for two hours, stirring and adding distilled water as it evaporates, to fill the same measure; strain, and pour into it as much diluted sulphuric acid as suffices to precipitate the oxysulphuret of antimony; then, with water, wash away the sulphate of potash, and dry what remains with a gentle heat.

E. Solution of potash f℥xj, water Oij; mix, and add sulphuret of antimony in fine powder ℥j; boil one hour, filter immediately, and precipitate while hot, with an excess of dilute sulphuric acid; collect the precipitate on calico, wash and dry it.

THEORY.—Sir R. Kane states, that when the sulphuret is dissolved by potash water, two double salts are formed, SbS_3+3KS, and SbO_3+3KO; if allowed to cool, a portion of both these compounds precipitates, mixed together, the SbS_3 and SbO_3 oxide and sulphuret of antimony depositing; this was formerly much employed in pharmacy under the term *Kermes' Mineral*, and considered to be a uniform preparation, a microscope however easily distinguishes in it the fine brown powder of the sulphuret, mixed with white crystals of oxide of antimony; Rose asserts that the presence of the latter is merely accidental. *But*, by adding sulphuric acid to the freshly prepared hot solution, as in the pharmacopœial processes, the sulphuret of potash it contains decomposes, forming sulphate of potash, and sulphuretted hydrogen, the latter reacting on the oxide of antimony, converts it into a sulphuret, and all the antimony falls as amorphous brown or orange sulphuret.

By heating black sulphuret of antimony with carbonate of potash, the same result is obtained by D. as if it were boiled in potash water, carbonic acid escaping from the mixture.

COMPOSITION.—Mr. Phillips states, that it looses twelve per cent, by boiling in a solution of bitartrate of potash, being the amount of teroxide it contains; he thinks it consists of one atom teroxide with five atoms of tersulphuret of antimony, and sixteen of water. "It is a mixture or compound of sesquioxide and sesquisulphuret of antimony with sulphur, E." The true golden sulphuret of chemists is a pentasulphuret, SbS_5.

ADULTERATIONS.—If it contain chalk, it will effervesce with dilute acids; E. states, it is "tasteless; twelve times its weight of muriatic acid will dissolve most of it, forming a colourless solution and leaving a little sulphur."

USES.—Sulphuret of antimony is diaphoretic, causing in large doses vomiting and purging; its effects are probably due to the teroxide it contains, and the quantity of this varying, its operation is uncertain; it is used in skin diseases, rheumatism, secondary syphilis, and liver affections, usually combined with mercurials and guaiacum, as in Plummer's pill.

DOSE.—As an alterative, gr. j to iv.

Kermes' Mineral was formerly used in inflammatory affections of the lungs, in chronic catarrhs, and at the end of pneumonias; in large doses it is emetic; on the continent it is still much employed.

Dose.—Gr. ss to gr. iij.

ANTIMONII OXYDUM, D. E. ($SbO_3=153$.)

Teroxide of Antimony.

The native ter or sesqui-oxide of antimony, termed white antimonial ore is found in Saxony and Bohemia; for medical use it is procured by precipitation, and has been long known as powder of algaroth, it is a white, tasteless powder, insoluble and unchanged by exposure to air; at a red heat, it fuses in closed vessels, into a yellow liquid which crystallizes on cooling; if melted in the air it absorbs oxygen, sometimes burning, and forms antimonious acid, SbO_4; when boiled with cream of tartar, it dissolves, producing tartar emetic. Its composition according to Berzelius is $SbCl_3,3SbO_3+3Aq$.

Preparation.—D. Pour solution of terchloride of antimony f℥xvj, into water cong. ij; stir well and set it aside, until the white precipitate which forms subsides; draw off the supernatant liquid by decanting or a syphon, agitate the sediment with distilled water cong. j; let it stand till the oxide falls to the bottom; again decant, place the sediment on a calico filter, and wash it with distilled water till the liquid that trickles through, very slightly reddens litmus paper. The precipitate is now to be shaken occasionally for half an hour, with solution of caustic potash Oj, and then washed on a filter, with boiling distilled water, until the washings cease to precipitate with an acid solution of nitrate of silver; dry the product at a heat not above 120°.

E. Sulphuret of antimony in powder ℥iv, dissolve in muriatic acid Oj, with a gentle heat; boil for half an hour, filter, and pour the fluid into water Ov; collect the precipitate on a calico filter; wash it well with cold water, then with a weak solution of carbonate of soda, and again with cold water, until the water ceases to affect red litmus paper; dry the powder over a vapour bath.

By E. a chloride of antimony is formed; D. employs it already prepared; on adding this chloride to water, it is decomposed, the chlorine uniting with hydrogen of the water to produce hydrochloric acid; while the antimony, and oxygen of the water combine and precipitate as oxide of antimony; $SbCl_3$ and $3HO,=SbO_3$ and $3HCl$. As the oxide falls, it usually carries down some unchanged chloride of antimony; by frequent washing with an alkaline solution, as water of caustic potash, D.; this is changed into oxide; E. directs carbonate of soda, which effects the same change; its carbonic acid escapes, and the chloride of sodium formed is afterwards removed by washing; $SbCl_3+3.NaO,CO_2,=SbO_3$; $3NaCl$; and $3CO_2$.

TESTS.—See antimony; boiled with cream of tartar it is quite soluble.

USES.—To prepare tartar emetic, and occasionally employed in doses of gr. j to viij, its effects are similar to antimonial powder.

PULVIS ANTIMONIALIS, D. E. PULVIS ANTIMONII COMPOSITUM, L. *Antimonial Powder.*

Used as a substitute for the celebrated James's fever powder, as his directions, which are lodged in Chancery, to prepare this medicine are so doubtfully worded, that it is found impossible to make it according to the form he gave; antimonial powder is white, without taste or smell; that of L. and E. is gritty, of D. is a fine powder.

Preparation.—D. Dissolve tartarized antimony ℥iv, in distilled water cong. ss, and phosphate of soda ℥iv, in distilled water Oij; mix when cold; then pour in chloride of calcium ℥ij, dissolved in distilled water Oij, having first added to the latter solution of ammonia f℥iv; boil now for twenty minutes, collect the precipitate which will then have formed on a calico filter, and wash it with hot distilled water, till the washings cease to precipitate with a dilute solution of nitrate of silver; then dry the product by steam or water heat, and finely powder it.

In this process, on mixing phosphate of soda and tartarized antimony, phosphate of antimony, and a tartrate of potash and soda (or Rochelle salt) may be considered as forming; the chloride of calcium converts the phosphate of antimony into phosphate of lime, which precipitates, and into chloride of antimony; by the ammonia the latter is changed into oxide of antimony, which falls along with the phosphate of lime, and into muriate of ammonia, which, with the Rochelle salt, is removed by washing.

L. Sesquisulphuret of antimony in powder ℔j, hartshorn shavings ℔ij; mix, and throw into a red hot crucible, stirring as long as vapours rise; powder the residue, put it in a proper crucible, apply heat, and increase it gradually, so that it may be red hot for two hours; then finely powder it.

E. Mix equal weights of coarsely powdered sulphuret of antimony and hartshorn shavings, and put them into a red hot iron pot; stir constantly, till they become ash grey, and vapours no longer arise; powder the product, put it in a crucible with a perforated cover, and expose to a gradually increasing heat, till a white heat is produced; keep it at this for two hours; and when cold, finely powder it.

Bones are usually employed instead of hartshorn shavings; *the theory* is, that heat destroys the animal parts of bone or horn, leaving subphosphate with some carbonate of lime, and sulphur is expelled from the antimony, as sulphurous acid gas; while the antimony, attracting oxygen from the air, changes into antimonious acid, and a varying amount of sesquioxide of antimony. By re-heating, some of this sesquioxide remains unchanged, some is volatilized, but most of it is converted into antimonious acid, with which the carbonate of lime, giving off carbonic acid, forms a small portion of antimonite of lime.

TESTS.—"Distilled water boiled with it and filtered, gives an orange precipitate, with sulphuretted hydrogen; muriatic acid, digested on the residue, becomes yellow, it is not made turbid by diluting, but gives a copious orange deposit, with sulphuretted hydrogen. E." Water dissolves antimonite of lime, and Dr. M'Lagan states, some super-phosphate; muriatic acid, takes up sesquioxide of antimony, and sub-phosphate of lime; and whatever is undissolved, is antimonious acid; Pereira has found the muriatic acid solution sometimes does give a white deposit of oxychloride when added to water.

Composition.—According to Dr. M'Lagan's analysis, the following is the composition of James's, and of Antimonial Powder.

	Antimonite and some super-phosphate of lime	Oxide of antimony.	Antimonious acid.	Sub-phosphate of lime.
James's Powder, Newbury's,	3·40	2·89	43·47	50·24
———————— Butler's,	2·25	9·80	34·21	53·21
Antimonial Powder,	·8	3·98	50·09	45·13

Kane considers antimonite of lime the only active substance, and he states, it rarely contains more than one per cent of this; Pereira thinks its effects due to oxide of antimony; following the latter view, the new form of D. is adopted. I made some years since, a preparation, somewhat similar, which was very active, by precipitating the oxide; but practice alone can determine if the new formula is an efficient substitute for James's powder, and whether the proportions are the best; at least, it will be found more definite in composition, than the old antimonial powder.

Uses.—James's powder is considered less likely to vary in its proportions than antimonial powder, though both at times seem quite inert, and sometimes operate violently; as genuine James's powder is very expensive, cheaper preparations are often substituted for it; they are used as diaphoretics in fever, inflammatory affections, and in acute rheumatism, for the latter, calomel and opium are often joined with the antimonial powder; sometimes it is found of service, in chronic skin affections; Dr. Cheyne advised it to counteract any apoplectic tendency, he gave gr. ij, and increased it by gr. ss every night, until gr. xviij were taken together, unless vomiting, or purging occurred, when the dose was diminished; in cerebral affections, and after injuries of the brain, antimonial or James's powder, is often combined with mercurials with decided benefit.

Dose.—Gr. ij to viij repeated every three or four hours, if necessary, in pill, bolus, or powder.

ANTIMONIUM TARTARIZATUM, D. E.
ANTIMONII POTASSIO-TARTRAS, L.
(KO,SbO$_3$, Tart. +3 Aq=359.) *Tartar Emetic.*

This was discovered by Mynsicht in 1631; it is usually in a white powder, or in transparent rhombic octohedrons, without smell, tasting at first sweetish, afterwards styptic and metallic; in the air the crystals become opaque, loosing four or five per cent of their weight; tartar emetic dissolves in fourteen parts of cold or two of boiling water, it is insoluble in alcohol; the solution reddens litmus, and if long kept it decomposes, a soft mass of vegetable growth, like cotton fibres forming in it.

Preparation.—D. Mix carefully, bitartrate of potash in fine powder ℥vj, with oxide of antimony ℥v, and with a little distilled water, form it into a thick paste, and set it aside for twenty-four hours; pour on this the rest of the distilled water (Oij in all) boiling, and having boiled for fifteen minutes, repeatedly stirring in a glass or porcelain vessel, filter through calico, returning the turbid liquor that passes through, till a clear solution is obtained; after twelve hours, decant the solution from the crystals now formed, and by boiling it down one-third and cooling, additional crystals will be procured; dry the salt on blotting paper, without heat, and keep it in a bottle.

L. Sesquisulphuret of antimony, and nitrate of potash, powdered, each, ℔ij, mix, and add hydrochloric acid f℥iv, spread the powder on an iron plate and ignite it; finely powder what remains, and wash it frequently with boiling water, till free from taste; mix the remaining powder with pulverized bitartrate of potash ℥xiv, and boil for half an hour, in distilled water cong. j; strain, and while hot, set it aside that crystals may form, these being removed and dried, again evaporate the liquor that it may yield more crystals.

E. Dissolve sulphuret of antimony in fine powder ℥iv, in muriatic acid Oj, with a gentle heat, boil for half an hour, and pour into water Ov, collect the precipitate in a calico filter, wash it with cold water, till the water ceases to redden litmus paper, and dry it over a vapour bath; mix of this precipitate ℥iij, and bitartrate of potash ℥iv ʒij, with water f℥xxvij, boil for an hour, and set it aside to crystallize; the mother liquid, when concentrated, yields more crystals, but not so free from colour, and therefore requiring a second crystallizing.

Theory.—In the E. process, a chloride of antimony is formed, and oxide of antimony (which see) obtained from it; this is dissolved by the cream of tartar producing tartar emetic. D. takes the oxide of antimony prepared, and dissolves it in cream of tartar. In the L. form the reactions are complicated, the oxygen of the nitre produces with the sulphuret, oxide of antimony and sulphuric acid, nitric oxide gas escaping; the potash is converted into sulphate by the sulphuric acid; and the muriatic acid combines with any free potash, and decomposes any sulphuret of potassium that may form; washing removes all the soluble salts, leaving oxide of antimony, mixed with some unchanged sulphuret; when boiled with cream of tartar, the oxide then produces tartar emetic.

TESTS.—Heated in a glass tube, it chars, shewing it contains an organic substance, tartaric acid; for other tests see antimony.

COMPOSITION.—It may be considered a double tartrate of antimony and potash, (KO, tart. SbO_3, tart.+3 Aq.); at 212° it looses one atom of water, and at 428° two more atoms, when some consider it no longer contains tartaric acid. As tartaric acid is bibasic, this salt may also be more correctly written ($KO,SbO_3,C_8H_4O_{10}+3HO$,) and by many it is thought to have only two atoms of water; in preparing it, all the tartar emetic never crystallizes, a portion of it forming a gummy compound of antimony, potash, and tartaric acid, which is uncrystallizable.

ADULTERATIONS.—It should be "entirely soluble in twenty parts of water, the solution colourless, and not affected by ferrocyanide of potassium; a solution in forty parts of water, is not affected by a solution of eight parts of acetate of lead, in thirty-two parts of water and fifteen parts of acetic acid, E." When crystallized, it is stated, its purity is easily determined, by dropping the crystals into sulphuretted hydrogen water, which produces an orange deposit round them; but, although this will shew the fraudulent addition of cream of tartar crystals, by not affecting them, it will not point out the most dangerous accidental impurity this salt is liable to, arsenic, which forms a crystalline compound with bitartrate of potash, similar in appearance to tartar emetic; this is best shewn by a modification of Marsh's apparatus (see arsenic), the mixture of arseniuret, and antimoniuret of hydrogen, being passed through a glass tube, heated strongly at one part, is decomposed there, all metallic antimony deposited at the heated point, and metallic arsenic in the cool part of the tube.

Bitartrate of potash is often added to tartar emetic, its "solubility in twenty parts of water, E.," is intended to detect this; Mr. Hennell has stated that, ten per cent of bitartrate may be present and yet soluble, he directed a few drops of a solution of carbonate of soda to be added to a boiling solution of the tarter emetic, if the precipitate that forms is re-dissolved, he asserted that cream of tartar is present;

the "acetate of lead, E" is also employed to detect cream of tartar, it was recommended by Mr. Henry, and forms a good test. When pure, emetic tartar is white, but a yellow preparation is also made, which some prefer, it is impure from containing iron; on adding to it a few drops of sulphuric acid, and then yellow prussiate of potash, prussian blue is formed.

USES.—Applied to the skin, tartar emetic is a powerful irritant, causing an eruption of pustules resembling small pox, which are often very painful; small sized pustules are produced by using a watery solution upon lint, and larger ones by applying the tartar emetic sprinkled on plaster; it is also frequently employed as ointment, and in France, by inoculation with a lancet dipped in a thick paste of tartarized antimony and water, making a puncture for every vesicle intended to be formed; its action is not invariable, and at times it produces but slight eruption, though nausea and vomiting may be caused by merely using it externally, and one instance is related of an infant, two years old, dying from its effects in forty-eight hours. It is used in chronic chest diseases, as catarrh, old pneumonic, and pleuritic affections, and in threatened phtysis; also for neuralgic pains, tic doloroux, the spinal irritation of hysteria, and in chronic inflammations of joints; Autenreith advised it for hooping cough to diminish the severity of the paroxysms; in some instances this counter irritation is kept up for weeks, and even months, being applied to different parts alternately. It is sometimes used over the scalp; in severe attacks of phrenitis and in mania, blisters are dressed with it to produce rapid and severe counter irritation, and it is often employed in sub-acute inflammations of the brain.

Given internally in small doses of one-sixteen to one-fourth of a grain it acts as an expectorant, and is prescribed in bronchitis and recent catarrhs; similar doses promote diaphoresis in febrile maladies, and from its effects of subduing vascular and cerebral excitement, it is often employed, when other diaphoretics are objectionable; if gastric or intestinal irritation exists it is not usual to employ tartar emetic. In doses of one-fourth to half a grain, combined with opium, Dr. Graves uses it in advanced stages of typhus, attended with cerebral disturbance, loss of sleep, and delirium, and Dr. Law has given it in delirium tremens and the delirium of eruptive diseases. For erysipelas, some prescribe a decoction of bark with tartarized antimony; this is usually said to be unchemical, but others state that decoctions of bark, kino, or rhatany, only partially neutralize tartar emetic; from this cause, or from more of it being added than the decoction combined with, I have no doubt of the fact, that I have seen nausea, sweating and full vomiting follow the use of this compound. Doses of gr. j to iij, operate as a powerful emetic, causing at the same time, much nausea and depression; from its energetic effects on the system, tartarized antimony has been recommended, with the intention of cutting short febrile diseases; it is very doubtful if emetics will check the course of typhus or the eruptive fevers; after the earliest stage it can have no such power, and is likely to cause harm by lowering the strength, which is rarely desirable; for gonorrhœal swelling of the testicle, bubo, inflamed tonsils, ophthalmia, and croup in its earliest stage, full vomiting is often found of benefit in arresting these affections; when croup is fully formed, mercury is more serviceable than tartarized antimony, or alternate doses of these remedies may be prescribed; in the latter stages of croup, when emetics are employed as a final effort with weak children, to stimulate them and evacuate the secretion of lymph and mucous from the throat, tartar emetic must be carefully avoided, and less exhausting substances used as ipecacuan or squill. In threatened suffocation from food lodged in the esophagus, tartarized antimony is given to expel it, two or three grains have even been dissolved in water f℥ij, and transfused into the veins for this purpose, it may act as speedily as if swallowed, but has often failed. Its emetic effects are felt, about ten to thirty minutes after taking moderate repeated doses, and from causing much nausea and depression, it is used to aid the reduction of dislocations of the hip, shoulder, &c., by diminishing the power of muscular resistance; with the same intention it is advised in rigidity of the os uteri during labor, in aiding the reduction of strangulated hernia, and for stricture; these views are accomplished by keeping up the state of nausea, rather than by causing perfect emesis.

Properties termed sedative, or contra-stimulant, are attributed to tartar emetic, this salt being considered when given in large doses as antiphlogistic; Rasori employed it thus in an epidemic fever at Genoa in 1808, and afterwards in pneumonia; for the latter disease, Læennec also prescribed it, he employed bleeding in addition, as most British practitioners do; but Trousseau states that blood-letting is singularly injurious to its sedative action. Læennec gave gr. j in a glass of mild fluid every second hour, for six doses, and then if the symptoms were less acute, suspend its use for six or eight hours. In severe attacks he increased the dose up to gr. ij or ijss, giving ℈j, and even ʒiss in the twenty-four hours. In pneumonia its effects are best seen, it has also been used for pleuritis, bronchitis, acute rheumatism, and arachnitis, but it is much inferior to mercury in checking the deposit of lymph in inflammatory affections. The explanations of its action are various; Læennec considered it increased interstitial absorption; Dr. MacCartney thought it lessened the force of the circulation from causing nausea; Rasari, that it was a direct sedative or counter stimulant; and Broussais, that it caused derivation from the mucous surface of the intestines; thus employed, it may nauseate or vomit when first given, while the succeeding doses are usually tolerated, and might be much increased without vomiting; it often causes no apparent effect, at other times, there is purging or diaphoresis; Rasori thought the tolerance of tartar emetic, lasted only while there was inflammation, but many consider this is not the case, at least in all instances; and Læennec states it is more common for tolerance to continue when once established; frequently, though not always, the pulse falls under its use, and beats so slowly as thirty-four to forty-four times in the minute.

In large doses it may act as a poison, forty grains has caused death in four days, with vomiting, severe purging, convulsions, delirium, and collapse; and ten grains in two instances proved fatal to children in a few hours; if an emetic dose of tartarized antimony does not cause vomiting, it may produce a smart attack of purging, and in many cases in which it acted as a poison, there was but slight vomiting, or it was altogether absent; other emetics are then rerequired to aid its expulsion. In death from it, the stomach and intestines are usually much inflamed, and Magendie considered it had a peculiar effect in causing engorgement of the lungs.

DOSE.—As an *expectorant and diaphoretic*, the sixteenth to the fourth of a grain, repeated every two or three hours; to cause *nausea*, the sixth to the fourth of a grain, every ten to thirty minutes; as an *emetic*, one to three grains, or half a grain every five minutes in solution; tartar emetic gr. j, ipecacuan ℈j, is a common form of emetic; as a *contra stimulant*, gr. ss to gr. iij or iv may be used in solution every three or four hours. Tartar emetic has been given in injection to produce its nauseating and other medical effects, by dissolving gr. ij or iij in mucilage f℥iv, and administering it with O'Beirne's tube; this is useful when the patient refuses to swallow, or is insensible, or when the stomach is much disordered.

Externally, a saturated solution, made by pouring boiling water f℥iss on tartar emetic ʒj, may be used as a liniment, or on pledgets of lint, to cause counter irritation; or gr. x to ʒj may be sprinkled in powder over a pitch plaster; or the ointment can be employed.

ANTIDOTES.—Decoction of galls, or yellow cinchona bark in powder, diffused through water, which is preferable to the decoction, being easier procured and more effectual; the stomach also must be emptied by the stomach pump or by emetics, as mustard, if the tartarized antimony has not caused full vomiting; and stimulants, with opium are required for the consequent diarrhœa and collapse.

Liquor Antimonii Tartarizati, D. *Vinum Antimoniale*, E. *Vinum Antimonii Potassio-Tartras*, L. *Antimonial Wine.*

Preparation.—D. Tartarized antimony ʒj, distilled water Oj; dissolve, filter through paper, and add rectified spirit f℥vij; mix.

L. E. Emetic tartar ℈ij, sherry Oj; dissolve.

Each f℥j contains gr. ij of tartarized antimony; sherry should be used for L. and E., as inferior wines decompose the salt; the D. preparation is colourless, but frequently it is tinged of a light brown by the addition of some burned sugar.

Dose.—Gtt x to xxx as an expectorant; ʒj to ij to cause nausea; or ʒij to iv, every ten minutes, until vomiting is produced; with young children ʒss to ʒj acts as an emetic.

Unguentum Antimonii Tartarizati, D. *Ung. Antim. Potassio-Tartras*, L. *Ung. Antimoniale*, E. *Tartar Emetic Ointment.*

Preparation.—D. Tartar emetic in very fine powder ʒj, ointment of white wax ʒvij; mix intimately.

L. E. Emetic Tartar in fine powder ℥j, lard ℥iv; mix.

This ointment should be well mixed, and applied only to sound skin, or it may cause troublesome ulcers, and even sloughing; with young children its use should be avoided; the bulk of a nut is generally rubbed, night and morning to the part; or it is employed spread on lint.

ARGENTUM. (Ag,=108.) *Silver.*

Silver is found native in masses and crystals, or alloyed with other metals, as gold, copper, and antimony; much of it is obtained as a sulphuret, mixed, in Ireland, with the ordinary lead ore galena, from which it is extracted by roasting the ore to expel the sulphur, then smelting it with charcoal, and as the fused metal cools, removing the lead which solidifies first, until only a small quantity of lead remains combined with the silver; by oxidizing this residue in a cupel, or vessel made of bone ash, the lead is converted into litharge, which sinks into the cupel, leaving a mass of pure silver. Where native silver abounds, it is easily procured by dissolving it out with mercury from the earthy ore, and then on distilling off the mercury, pure silver is left behind.

It is a brilliant white metal, very soft, of dens. 10·4; it melts at a red heat (1873° Daniell), and when fused, will rapidly absorb oxygen, taking up sometimes as much as twenty-two times its volume of this gas, but parting with it again on cooling; when solid, silver is not affected by oxygen, but is gradually tarnished by sulphuretted hydrogen, becoming dark coloured; the silver used for coin in this country is an alloy, containing eighteen parts of copper with 222 of silver.

TESTS.—Dissolved in nitric acid, it produces on adding any soluble chloride, a white curdy precipitate, the chloride of silver, which is blackened by sun light, and when fused becomes a horny looking mass; it is insoluble in dilute acids, and soluble in ammonia. With iodide of potassium it forms a yellow iodide of silver, soluble in excess of iodide of potassium. Phosphorus, or slips of copper, precipitate metallic silver from its solutions, and its salts are easily reduced when heated with carbonate of soda before the blow pipe.

USES.—Silver leaf is employed to cover pills, and the following amalgam of it is used for stopping decayed teeth:—Take silver filings, or the fine powder of precipitated silver gr. vij, mercury gr. x; mix them in the hand until they form a soft mass, which must at once be placed in the hollow tooth, where it gradually hardens; it should not be allowed to project beyond the other teeth.

Precipitated Silver is made by placing a slip of copper in a solution of nitrate of silver; the precipitate should be washed with water of ammonia to remove any copper, then with distilled water, and dried.

ARGENTI OXYDUM, D. (AgO,=116.)

Oxide of Silver.

Preparation.—Dissolve nitrate of silver ℥ss, in distilled water f℥iv, pour it into a bottle containing lime water cong. ss. (or a sufficiency), and shake well, let the sediment subside, draw off the supernatant liquid, place the sediment on a filter and wash it with distilled water f℥ij, dry it at a heat not exceeding 212°, and keep it in a bottle.

This yields about ʒiij of a dark brown oxide, slightly soluble in water, forming a solution of alkaline reaction and metallic taste; it may also be prepared by using liquor potassæ instead of lime water; but ammonia should not be employed, as it is liable to form fulminating silver, and pills made from the oxide thus obtained, are stated to be subject to spontaneous combustion.

USES.—Mr. Lane and Sementini advise it instead of nitrate of silver for epilepsy, gastrodynia, chronic diarrhœa, and other diseases for which the latter salt is employed; it has no causticity, and its continued use is considered less likely to discolour the skin.

DOSE.—Gr. ss to ij twice or thrice daily; being easily decomposed, it should not be combined with vegetable substances; an ointment of gr. x to lard ℥j, is used for venereal ulcers.

ARGENTI NITRAS, D. L. E. ($AgO,NO_5=170.$)

Nitrate of Silver.

Nitrate of silver or lunar caustic is usually sold in rods or pencils, of the thickness of a writing pen; it can also be procured in transparent, colourless, right rhombic prisms, permanent in the air; it has a strong, metallic, bitter taste, is soluble in its own weight of cold, in half its weight of hot water, or in four parts of alcohol; heated to 430° it fuses into a colourless liquid, which when poured into moulds and cooled, forms the pencils of lunar caustic; as met in the shops, it rapidly becomes dark coloured on the surface when exposed to light, silver being reduced, by the organic matter left from handling it, and wrapping the sticks in paper, before sending them for sale, as Mr. Scanlan has shewn that if all organic substances are absent, the salt does not darken with light.

Preparation.—D. Place refined silver ℥iij in a flask, pour on it pure nitric acid f℥ij, distilled water f℥v, and gently heat it till dissolved; transfer the solution to a porcelain capsule, decanting it from a heavy black powder which appears at the bottom of the flask, and having evaporated it to dryness, raise the heat (in a dark room) until it melts; then pour it into a brass mould, with cylindric cavities the size of a goose quill, and which can be opened by a hinge; when the salt concretes, remove and keep it in stoppered bottles impervious to light.

L. Silver ℥iss, nitric acid f℥i, distilled water f℥ij; dissolve in a sand bath; increase the heat gradually to dry the nitrate of silver; melt this in a crucible, over a slow fire, till ebullition ceases, then pour it into proper moulds.

E. A similar process in making it, then fuse the salt in an earthen or porcelain capsule, and pour it into heated moulds, slightly greased with tallow.

The greasing, E., is unnecessary, and not employed; the black sediment mentioned by D. is gold, a small quantity of which is frequently found in commercial silver.

Theory.—Three parts of silver abstract three atoms of oxygen from one part of nitric acid, gaseous nitric oxide escaping; and the three parts of oxide of silver uniting with three more parts of nitric acid, produce three parts, or atoms, of nitrate of silver.

$3Ag$; and $4NO_5$; $= 3AgO,NO_5$, and NO_2.

TESTS.—It affords nitrous fumes when heated with sulphuric acid; deflagrates when thrown on the fire, and yields all the other reactions detailed for nitric acid. The tests for silver detect it.

ADULTERATIONS.—It may contain nitrates of potash or copper, and occasionally lead, zinc, and manganese have been found in it; if pure, its sticks have when broken across, a radiated structure; copper is suspected if the salt readily deliquesces, and is tested by liquor ammonia, causing in its solution a blue colour. Nitre is probably present, when the sticks break uniformly and are not radiated, it is discovered by precipitating the silver with muriatic acid, the filtered liquid contains any nitre, and by evaporating, it may be crystallized. Sulphuretted hydrogen added to a similar solution would cause a white deposit with zinc, and a black with copper, if they were present; "twenty-nine grains in distilled water f℥j, acidulated with nitric acid, and precipitated with a solution of muriate of ammonia gr. ix, will precipitate with more of the test, E." This detects within one per cent of impurity, for 9·12 grains of the muriate will decompose twenty-nine grains of nitrate of silver.

EFFECTS.—Nitrate of silver is much employed as a manageable caustic; applied to the skin or mucous tissue, it forms a white stain by uniting with the albumen of the part, this rapidly becomes grey and then black if exposed to light, particularly bright sunshine, the part losing its vitality; for this reason it is used to destroy corns and warts, to check granulations, and from its coagulating albumen it is applied to arrest the bleeding of leech bites. When freely rubbed on the cuticle it causes vesication, and is thus employed in erysipelas to prevent its extension, by applying a moistened stick of caustic on the edge of the eruption and around it on the sound skin; at times this has caused considerable pain, and even produced fever and delirium when extensively used on the scalp. To check inflammation of the absorbents, and in paronychia, a liberal pencilling over the affected part with nitrate of silver is often found beneficial; some advise its use in punctured and dissecting wounds, but the pain and suppuration it is liable to excite, render it objectionable; for contused and lacerated wounds, some practitioners apply it round the edges to diminish, as they state, the inflammation, and cause speedy adhesion. Lightly touched over ulcers it stimulates the process of granulation; if used more extensively, it will destroy them, and is prescribed with this intention when they are too exuberant, if possible, it should not touch the new skin forming around an ulcer at any time. For syphilitic primary sores, lunar caustic is employed, sometimes with the intention of destroying them ; if the entire sore is cauterized in the early stage, it is often of service, but nitrate of copper is a preferable caustic for this purpose ; when chancres are more advanced, they may be frequently healed by repeated applications of lunar caustic ; some consider this treatment removes the indications of cure by constitutional remedies, and do not employ it, but as there is danger of constitutional contamination while the sore exists, it seems desirable to heal it as soon as possible ; for venereal ulcers of the throat it is often used to promote their cicatrizing ; and for inflammatory affections of the fauces from scarlatina, tonsillitis, &c., solid nitrate of silver or its solutions are applied with good effect ; in addition to checking the inflammation, it forms a compound with the mucous tissue, which both protects it from over action of the nitrate, and sheaths the inflamed parts with a coating which diminishes their acute sensibility, and enables the patient to drink or swallow with some ease. To prevent pitting in small pox, Brettoneau advises its application to the pustules, if employed at all, it should be on the first or second day of the eruption. For gonorrhœa of females, and vaginal leucorrhœa it is occasionally applied in solution or the solid form, in some instances this has cured within twenty-four hours, but it is difficult to apply it fully to the affected parts, an injection of gr. iij to ℈ij in the f℥j of water may be used for this purpose ; for gonorrhœa in males, an ointment of it has been applied to the urethra, or strong injections, as ℈j or even ʒj of nitrate of silver to water f℥j, have been used with the intention of rapidly checking the disease, it often succeeds, but is liable to serious accidents, as acute inflammation of the urethra, hœmorrhage, the formation of large sloughs of mucous membrane, and frequently causes severe pain ; it may also, after all this, fail in curing the discharge ; weaker solutions as gr. j or ij to f℥j may be used as ordinary urethral injections in this disease. To strictures of the urethra, nitrate of silver is occasionally applied by heating the point of a wax bougie, and fastening a fragment of caustic in it while soft, and a similar application has been advised for stricture of the esophagus ; in obstinate spermatorrhœa, the orifices of the seminal ducts are cauterized with nitrate of silver by an instrument specially made for this purpose, this treatment is frequently of decided benefit ; for fissures of the nipples or about the lips, it is often prescribed, and to fissures and ulcers of the rectum which do not extend through the mucous membrane, its application is often beneficial ; in conjunctivitis with purulent discharge, weak solutions of gr. ss to f℥j of distilled water are used as a wash, or a strong solution of ʒss to f℥j may be dropped into the eye; Guthrie recommends an ointment composed of nitrate of silver gr. ij to x, solution of subacetate of lead gtt xv, spermaceti ointment ʒj, from the bulk of a pins head to a pea is placed between the lids every three days, and warm anodyne stupes used, he employs it in acute and chronic attacks, and combines other medical means as blood-letting, calomel, &c; to ulcers of the cornea, the best application in many cases is a pointed stick of lunar caustic lightly applied. Its long continued use has stained the conjunctiva of a dark colour, and is liable to cause opaque specks on the cornea.

To point a stick of caustic, rub one end between the fingers in a little wet lint until enough caustic is dissolved and the stick properly pointed.

Internally it is prescribed in chronic gastric affections, where there is morbid sensibility of the nerves, and to allay chronic vomiting, also for dysentery and ulcerations of the intestines; in chorea and epilepsy it has been often tried, in some instances successfully, though in general without benefit; for diabetes and angina pectoris, it has been recommended as occasionally of use; its action is considered to be that of a tonic, but its continued exhibition, which is in general necessary, is liable to stain the skin of an indelible leaden, or indigo hue, which is so objectionable that it is rarely employed internally; the iodide and oxide of silver are said to possess its medical powers without this effect of colouring the skin, and therefore preferred. If taken in large doses or in a strong solution, it acts as a corrosive poison, causing a strongly disagreeable taste, pain and tenderness of the stomach and vomiting; in two instances death has been produced by it.

DOSE.—The eight of a grain, gradually increased to gr. iij or iv, three times in the day; as much as gr. xv has been given; it should be prescribed in pills, as the solution is likely to cause vomiting; some object to bread for forming these pills, from its containing salt, but the quantity of this is very small, almost homœopathic in gr. v of bread; its exhibition should never be continued more than four or six weeks at a time, lest it discolour the skin. For lotions, &c., it is used in variable proportions from gr. ss to ʒj being dissolved in distilled water f℥j.

ANTIDOTES.—Common salt which decomposes it, forming nitrate of soda and chloride of silver; magnesia may also be given, and vomiting should be promoted; any gastritis which may arise, requires the ordinary treatment.

Liquor Argenti Nitratis, L. *Solutio Argenti Nitratis*, E.
Solution of Nitrate of Silver.

Preparation.—L. Nitrate of silver ʒj, distilled water f℥j; dissolve.

E. Nitrate of silver gr. xxxx, distilled water gr. 1600; dissolve and strain; keep it in closed bottles, the access of light being prevented.

Used as a test for chlorides, with which it forms a white curdy precipitate.

Solutio Argenti Ammoniati, E. *Ammoniated Solution of Nitrate of Silver.*

Preparation.—Take nitrate of silver gr. xliv, distilled water f℥j; dissolve, and add aqua ammoniæ gradually, till the precipitate first thrown down is very nearly re-dissolved.

This is Hume's test liquid. See arsenic.

Marking Ink for Linen.—Dissolve carbonate of soda ʒiv, gum ʒij, in water f℥iij; apply this preparation to the linen, and when dry, write on the part with the following ink, using a quill pen:—Nitrate of silver ℈v, sap green ℈j, gum ʒj, distilled water f℥j.

ARGENTI CYANIDUM, L. (AgCy,=134.)
Cyanide of Silver.

This is a white powder, insoluble in ammonia, and decomposed by muriatic acid or sulphuretted hydrogen, which form hydrocyanic acid with it. In France it has been given internally in doses of one-tenth of a grain for syphilis, and is sometimes used to obtain prussic acid.

Preparation.—Dissolve nitrate of silver ℥ij ʒij, in distilled water Oj; add dilute hydrocyanic acid Oj, mix; wash the precipitate with distilled water and dry it.

Nitric acid is set free, and hydrocyanic acid uniting with the oxide of silver forms cyanide of silver and water.

AgO,NO_5 and HCy, produce AgCy, and NO_5,HO.

TESTS.—Heated in a glass tube, it gives cyanogen gas, which is combustible, burning with a rose coloured flame and blue halo, and leaving a residue of silver.

AURUM. (Au,=199.) *Gold.*

Gold is always found in the metallic state, sometimes forming cubes; usually it is mixed with sand as gold dust, or scattered through primary rock; its colour is yellow; dens. 19·4; it is very soft and ductile, and from its great malleability can be made into very thin leaves, which are of a greenish colour with transmitted light; having no tendency to oxidize, it is often termed a noble metal; it melts at 2016°.

TESTS.—Protosulphate of iron throws down from neutral solutions a dark brown deposit of metallic gold; a mixture of protochloride with perchloride of tin, forms a purplish precipitate, the purple powder of Cassius; oxalic or sulphurous acids, and most organic substances precipitate metallic gold more or less quickly from its solutions.

USES.—Gold leaf is employed to envelope disagreeable remedies, and hide the taste of pills; in thicker leaves, dentists use it to fill decayed teeth; internally, finely powdered gold has been given in doses of the quarter of a grain to gr. j, three or four times in the day as an antisyphilitic remedy, and for scrofula and glandular enlargements; M. Chrestien employed it in frictions to the tongue, and Dr. Niel by dressing small blisters with an ointment of gold gr. j, lard gr. xxx, but Cazenave considers it inert.

ANTIDOTES.—In poisoning with any preparations of gold; albumen, emetics, and the other remedies used for corrosive sublimate, may be given.

Pulvis Auri, French Codex. *Powdered Gold.*

Preparation.— Rub gold leaf with eight times its weight of sulphate of potash, and then wash with boiling water to remove the sulphate. Or dissolve chloride of gold in water, and add a strong solution of protosulphate of iron, after twenty-four hours collect, wash, and dry the precipitate.

Auri Teroxydum, French Codex. *Teroxide of Gold, or Auric Acid.*

Preparation.—Boil together gently, calcined magnesia forty parts, terchloride of gold one part, water forty parts, wash the precipitate with water to remove the chloride of magnesium, then with dilute nitric acid to remove the excess of magnesia, and dry the residue without heat in the dark. A brown powder remains, insoluble in water; it is used in scrofulous and venereal diseases. *Dose.*—One-tenth of a grain to gr. j.

Purple of Cassius.—May be made by mixing solutions of chloride of tin and chloride of gold, and collecting and drying the precipitate; its composition is imperfectly understood. Its *uses* aud *doses* are similar to the other preparations of gold.

Auri Terchloridum, French Codex. *Terchloride of Gold.*

Preparation.—Dissolve gold one part, in nitro muriatic acid three parts, evaporate until chlorine vapours begin to escape, and crystallize.

It forms a crystalline orange red mass, of styptic disagreeable taste; it dissolves in water and alcohol, and stains the cuticle purple; many metals as iron and copper, some metallic salts, gum, sugar, &c., decompose and are therefore incompatible with it.

Its effects resemble those of corrosive sublimate, than which Chrestien states it is more active; it may cause gastric irritation, colicy pains, and purging, one-tenth of a grain taken in the day has caused smart fever; it is used in chronic skin diseases, syphilitic and scrofulous ulcers, lupus, &c.

Dose.—The twentieth of a grain dissolved in water or applied by friction to the mouth. *Recammier's Caustic* is composed of chloride of gold gr. vj, nitro muriatic acid f℥j, dissolve; it is applied on lint to cancerous and other ulcers, for uterine diseases, &c.

Sodii Auro Terchloridum, French Codex. *Chloride of Gold and Sodium.*

Preparation.—Dissolve terchloride of gold eighty-five parts, chloride of sodium sixteen parts, in a little distilled water, evaporate and crystallize.

It forms yellow, quadrangular, elongated prisms, slightly deliquescent, and soluble in four parts of water; it is the preparation of gold usually preferred, and may be given in pills with starch or orris powder in doses of gr. one-twentieth to one-tenth, or applied by friction to the gums and tongue; it has been used in ointment to dress ulcers or applied to a freshly blistered surface in the proportion of one part to thirty parts of lard.

Auri Iodidum, French Codex. *Iodide of Gold.*

Preparation.—Made by adding solutions of iodide of potassium and of chloride of gold, and washing the precipitate with alcohol to remove any excess of iodine.

This is said to be a protoiodide AuI, it is yellowish green, not dissolved by cold, and slightly soluble in hot water. *Dose.*—From the fifteenth to the tenth of a grain, in pills with gum, which it is stated will not decompose it.

BISMUTHUM, (Bi,=71.) *Bismuth.*

Agricola described bismuth in 1529, which was formerly confounded with lead; it is found in Cornwall, Bohemia, &c., in the metallic form, and more rarely in combination with oxygen or sulphur, and obtained by melting the metal from its earthy ore. Bismuth is of a reddish white hue, hard, brittle, and readily crystallizing in octohedra or cubes, dens. 9·8; at 476° it melts, and may be volatilized at a white heat; if exposed to the air, it then takes fire and burns with a pale blue flame, forming copious white clouds of oxide. It is used to prepare the trisnitrate, in the metallic state it is inert.

TESTS.—It is attacked with difficulty by muriatic or sulphuric acid, in nitric acid it readily dissolves; if this solution be added to water, a white precipitate falls, which is blackened by sulphuretted hydrogen; iodide of potassium forms with salts of bismuth, an orange iodide, soluble in excess of iodide of potassium.

ADULTERATIONS.—Bismuth may contain copper; it should be "soluble in dilute nitric acid; when subnitrate of bismuth is precipitated from this solution by ammonia, the liquor is free from colour. L." If copper is present, the solution has a blue tinge.

BISMUTHI SUBNITRAS, D. E.

BISMUTHI TRISNITRAS, L. *Subnitrate of Bismuth.*

This salt is also termed bismuthum album, E. and is known as pearl, or Spanish white; it is a tasteless, heavy, white powder, which if examined by a lens, is found to consist of small crystals; it dissolves sparingly in boiling water, and on cooling again precipitates; by exposure to light it becomes greyish.

Preparation.—D. In pure nitric acid f℥iij, diluted with distilled water f℥iij, dissolve fragments of bismuth ℥ij, in successive portions; when the spontaneous action ceases, heat for ten minutes, nearly to boiling, and decant the solution from any undissolved particles of metal; gently evaporate the solution to f℥ij, and pour it into distilled water cong. ss; when the precipitate formed subsides, decant the supernatant liquid, and agitate the sediment with distilled water cong. ss; after twelve hours decant it; collect the precipitate on a filter, dry it at 212°, and reduce it to powder.

L. Nitric acid f℥iss, distilled water f℥j; mix and dissolve in it bismuth ℥j; pour off the solution, and add it to distilled water Oiij; let the powder subside, pour off the clear fluid, wash the trisnitrate of bismuth with distilled water, and dry it with a gentle heat.

E. employs a similar process; collect the powder on a calico filter, wash quickly with distilled water, and dry it in the dark.

The bismuth is oxidized by some of the nitric acid that is decomposed into oxygen, and nitrous fumes which escape; this oxide unites with the rest of the nitric acid, forming a slightly acid solution of nitrate ofbismuth. BiO,NO_5+3HO, from which, by evaporation, large colourless crystals can be procured; when added to water, the solution is decomposed into an insoluble subnitrate BiO,NO_5+3BiO,HO, and a fluid which still contains a little bismuth. When a neutral solution is added to a large quantity of water, a similar looking precipitate falls, which contains rather less of the metal; but both these deposits are used indiscriminately in medicine.

Impurities.—Not liable to any; "it is soluble in nitric acid, without effervescence; diluted sulphuric acid being added, nothing is thrown down, L." showing its freedom from carbonate of lead or barytes.

Uses.—In moderate doses, subnitrate of bismuth is of benefit in gastrodynia and pyrosis; this is attributed to its astringent and tonic powers, it is also said to have a peculiar sedative action on the gastric nerves, and when there is no organic disease, it often proves useful, but is less employed than formerly. It is sometimes prescribed for spasmodic affections, epilepsy, asthma, &c. In large doses it is poisonous; ℥ij has caused burning in the throat, vomiting, purging, coldness of the surface, and cramps, with death in nine days; and on examination the intestinal canal was found inflamed, and in parts gangrenous. Externally, it has been used as a cosmetic, but is stated to injure the skin.

Dose.—Gr. v to xx, in powder, or suspended in bitter infusions.

Antidotes.—None known; emetics and demulcent fluids must be given; the inflammatory symptoms that may arise are treated as usual.

CUPRUM. (Cu,=32.) *Copper.*

Copper, called Venus by the alchemysts, was known since remote ages; it is found in the state of metal, or combined with sulphur, chlorine, arsenic, &c., and it exists in minute quantity in the ashes of many plants. Copper is usually obtained from the yellow copper ore, a double sulphuret of copper and iron; by roasting in a furnace, the iron is converted into oxide, and when heated with siliceous sand, this forms a slag which separates from the copper; after all the iron is removed, the sulphuret of copper decomposes, loosing sulphur and absorbing oxygen, by increased heat and the aid of carbon, the oxide of copper is finally reduced to pure metallic copper.

Its colour is reddish yellow, and it is very malleable and ductile, dens. 8·9; its taste is disagreeable, and its smell peculiar; when exposed to the air it is slowly covered with a green crust of subcarbonate; at 1996° it fuses, the melted metal yields rhombohedral crystals, but native copper forms cubes and octohedrons.

Tests.—In solution, ammonia produces with it a blueish white precipitate, soluble in excess of ammonia, forming a deep blue fluid; yellow prussiate of potash causes a chocolate brown deposit of prussiate of copper; sulphuretted hydrogen, a brownish black sulphuret; and a rod of iron decomposes acid solutions of copper, becoming covered with the deposited metal.

EFFECTS.—Copper is not used medically; if copper coins are swallowed they may form poisonous compounds with the fluids of the stomach, but are more likely to cause injury by their mechanical action which ulcerates the mucous membrane, and may even open into arteries; some years since, copper was much used for cooking, and often produced dangerous symptoms, it is now seldom employed, and such accidents are therefore rare; if the copper be clean, ill effects can hardly arise from cooking in it, but if the food is allowed to cool in the vessel, particularly when it contains fat, salt, or acids, as vinegar, then the copper may be dissolved, and give rise to symptoms of poisoning; this occurs chiefly at the surface, where air by oxidizing the metal, renders it soluble.

The preparations of copper when taken in small quantities, cause colic, vomiting, diarrhœa, slow fever, cramps, and paralysis, but their effects are not fully understood; in larger doses severe vomiting is rapidly produced, and when much of any preparation of copper is taken, violent gastro-intestinal inflammation arises, with pain, severe purging, convulsions, cramps, and insensibility, sometimes jaundice is observed; as the salts of copper are usually blue or green, the vomited matters and the mucous membrane of the mouth and stomach are coloured by them.

ANTIDOTES.—Most of the copper salts combine with albumen, coagulating it, therefore, white of egg, or in its absence flour mixed in water should be given, being the best antidotes, and the emetic action of the cupreous preparations should be aided by warm drinks, and tickling the throat; iron filings have been advised to reduce the copper to the state of metal, which is inert, but they are an improper application to a stomach, the mucous coat of which must be more or less injured by the poison, and which will soon pass into an inflamed state; sugar has been also advised, it decomposes copper very slowly at the temperature of the stomach, and may be considered inert; cane sugar is also much inferior to grape sugar or honey in reducing copper at any temperature.

CUPRI SULPHAS, D. L. E. ($CuO,SO_3+5HO=125.$)

Sulphate of Copper.

This substance, commonly termed blue vitriol or blue stone, is found in the waters of many copper mines, and sometimes as a mineral; it forms crystals of a fine blue colour, modifications of the oblique rhombic prism, odourless and of a styptic metallic taste;

dens. 2·2. dissolving in four parts of cold or two of boiling water; the solution reddens litmus paper; exposed to dry air, the crystals lose four atoms of water, but retain the fifth until heated to 430°, when they become white and fall into powder; at a red heat the salt decomposes.

Preparation.—It is obtained by evaporating the cupreous waters of mines, or by roasting the native sulphuret of copper, which oxidizing, yields a sulphate; as this ore usually contains sulphuret of iron, the salt so produced is often contaminated with sulphate of iron. In purifying silver in the mint, and separating gold from it, much sulphate of copper is made, which is sold; the silver is dissolved in sulphuric acid which leaves all the gold undissolved, by adding plates of copper to the solution, the silver is then precipitated in fine powder, and the sulphate of copper that forms in the solution is crystallized.

TESTS.—Chloride of barium forms a white precipitate with it, insoluble in acids, shewing it to be a sulphate.

IMPURITIES.—It sometimes contains sulphate of iron, of which as much as fifty-four per cent has been detected in it, the following test shews this adulteration; "whatever ammonia throws down an excess of ammonia dissolves, L." If iron is present it remains insoluble.

USES.—The solid sulphate of copper is applied externally to repress exuberant granulations in burns and ulcers, and occasionally to destroy venereal primary sores; sometimes it is used to check bleeding from small vessels, and it is rubbed to the granular conjunctiva in chronic ophthalmia, to check the excessive growth of the hypertrophied papillæ. Solutions of varying strength are also employed, an injection of gr. ss to gr. ij in f℥j of water is prescribed in gonorrhœa, or used as a collyrium for chronic conjunctivitis; for vaginal discharges, gr. j to gr. x may be dissolved in the f℥j, and to ulcers, much stronger solutions have been applied as ℈j or ʒj in f℥j. Taken internally, gr. x to xx, acts as a speedy emetic, it should be given dissolved, and rarely causes much nausea, but is seldom employed except in narcotic poisoning, and for some cases of croup, being itself a powerful irritant if not soon expelled from the stomach, and on this account, sulphate of zinc is usually preferable. As a tonic, it is directed, in moderate doses for ague, chorea, and epilepsy; and from its astringent effects, is frequently used with benefit in chronic diarrhœa and dysentery, and in ulcerations of the intestines, for this purpose, it is usually given in pill; enemata containing ℈j to ij may also be employed with good effects in chronic dysentery. In large doses it is poisonous, inflaming the throat, stomach, and intestines, and causing the symptom already described under copper; a child sixteen months old has died from its effects in four hours; it caused in this instance vomiting and insensibility, but no diarrhœa or convulsions. Its local corrosive action depends on its combining with the tissues as it does with albumen, forming a blueish white compound; this is stated to consist of ninety parts of albumen, and ten parts of copper.

ANTIDOTES.—Albumen. See copper.

DOSE.—As a tonic and astringent, from a quarter of a grain to gr. ij, or even to gr. vj; as an emetic, gr. x to xx.

CUPRI AMMONIO-SULPHAS, D. L. CUPRUM AMMONIATUM, E. *Ammonio-Sulphate of Copper.*

Ammoniated copper was introduced into practice by Cullen; it is a deep azure coloured powder, of a styptic coppery taste, and having the smell of ammonia, which it contains in excess; this causes it to react alkaline; if exposed to the air, ammonia is evolved, and a green powder remains, consisting of sulphate of ammonia and carbonate of copper; it is soluble in water, but unless an excess of ammonia is present, it decomposes, and precipitates a subsulphate of copper; the composition of ammoniated copper may be written $NH_3,CuO+NH_3,HO,SO_3.=123$.

Preparation.—D. Rub sulphate of copper ʒij, with commercial sesquicarbonate of ammonia ʒiij, in a porcelain mortar, till effervescence ceases; then roll the residue in bibulous paper, and place it on a porous brick; when dry, enclose it in a stoppered bottle.

The process of L. and E. are similar in all essential respects.

In preparing it, effervescence occurs from carbonic acid escaping, and the compound becomes moist, from the water of crystallization of the salts, which is also set free. Kane considers it to be AdH,HO,SO_3+AdH,CuO, or a sulphate of ammonia and ammoniacal oxide of copper, containing some excess of carbonate of ammonia; its exact composition is not fully decided; it has in it one atom of oxide of copper, two atoms of ammonia, one of sulphuric acid, and one of water.

TESTS.—"By heat, it is changed into oxide of copper, evolving ammonia; in solution, it browns turmeric; and a solution of arsenious acid renders it of a green colour. L."

EFFECTS.—As a tonic, and antispasmodic, it has been advised in chorea, hysteria, epilepsy (by Cullen, &c.), and for other spasmodic affections; in large doses, it is a speedy emetic.

DOSE.—Gr. one-half, gradually increased to gr. v, usually in a pill; Cullen recommended its use not to be prolonged more than one month at a time, and if the epilepsy continued, he afterwards gave it for a few days before the paroxysm.

Pilulæ Cupri Ammoniati, E. *Pills of Ammoniated Copper.*

Preparation.—Ammoniated copper in fine powder, one part, bread crumb six parts, solution of carbonate of ammonia a sufficiency; beat them into a proper mass, and divide into pills, each containing gr. ss of ammoniated copper.

Dose.—One to six pills.

Liquor Cupri Ammonio Sulphatis, L. *Solutio Cupri Ammoniati*, E. *Solution of Ammoniated Copper.*

Preparation.—Ammoniated copper ℥j, water Oj; dissolve and strain.

Uses.—Chiefly as a test for arsenious acid, with which it forms Scheele's green; it has been applied as a stimulant to chronic ulcers.

CUPRI SUBACETAS, D. ÆRUGO, D. L. E.

Verdigris.

The subacetate, or diacetate of copper, is usually imported from France, in masses weighing from fourteen to thirty pounds; some of it is also prepared in England; it is sold in powder, or irregular sized lumps; its colour is blue (blue verdigris), or blueish green (green verdigris); its odour is rather disagreeable and acetous, its taste styptic, and strongly metallic; water at 60° decomposes it, and of 100 parts, dissolves 56 of soluble acetate, leaving 44 of insoluble green tris-acetate; it does not dissolve in alcohol. The blue verdigris is a hydrated diacetate, or ($2CuO,C_4H_3O_3+6Aq.$) Green verdigris is a mixture of the tris-acetate ($3CuO,C_4H_3O_3+2Aq$), and the sub-sesquiacetate ($3CuO,2C_4H_3O_3+6Aq.$)

Preparation.—It is made at Montpelier, by placing plates of copper in jars, with the moistened marc, or refuse of grapes, which remains after expressing their juice; this forms acetic acid, which uniting with the copper, already oxidized from the air, produces a green crust of acetate. After ten to twenty days the plates are removed, piled up in damp cellars, and occasionally moistened with water, to convert the acetate, by combining with more copper, into subacetate; the thick coating of which is scraped off and sold to dealers, who beat it into a paste in wooden mortars, and pack it in bags of white leather. At Grenoble, a purer verdigris is made by repeatedly moistening plates of copper with vinegar. In England, woollen cloths are damped in pyroligneous acid, and placed between sheets of copper, until they form a thick layer of verdigris, which is then removed, and made into masses for sale.

TESTS.—Heated with alcohol and sulphuric acid, it disengages the peculiar odour of acetic ether; heated alone, in a tube, or with sulphuric acid, it gives out acetic acid; and dissolved in water, it can be examined for copper, (which see.)

IMPURITIES.—It may contain fragments of unchanged copper, grape husks, or stalks, but the adulteration with chalk, sand, or sulphate of copper is more important; chalk dissolves with effervescence on adding dilute acids; sand is left by dissolving the verdigris in muriatic acid; and sulphates are detected by giving an abundant white precipitate with chloride of barium. "It is partly soluble in water, almost entirely soluble in ammonia, or with the aid of heat in dilute sulphuric acid. L." "It dissolves in great measure in muriatic acid, not above five per cent of impurity being left. E."

USES.—The powder is used as an escharotic to ulcers, and mixed with savin is employed to destroy warts; formerly it was given internally, but is considered dangerous. In full doses it acts as an emetic, and in larger quantity is poisonous, causing severe gastro-intestinal inflammation, convulsions, and paralysis; half an ounce of it has proved fatal in sixty hours; after death, the stomach and upper part of the intestines are usually found of a green colour, from the chemical action of the verdigris on the mucous membrane.

ANTIDOTES.—See copper.

Cupri Subacetas Præparatum, D. *Prepared Verdigris.*

Preparation.—Take subacetate of copper, reduce it to fine powder by triturating in a porcelain mortar, and separate the finer parts for use by means of a sieve.

Linimentum Æruginis, L. *Mel Ægyptiacum. Oxymel Æruginis.*

Preparation.—Verdigris powdered ℥j, vinegar f℥vij; dissolve, strain through linen, and add clarified honey ℥xiv; boil down to a proper consistence.

Uses.—A stimulating detergent, and slight caustic; it is applied to venereal, and other ulcerations of the tonsils and fauces, and sometimes to ulcers on the body. When properly made, it is a good application, but the heat ordered in making it, if not applied with great care, totally decomposes the salt, metallic copper, or its oxide, precipitating and leaving a mere solution of vinegar and honey; with formic acid according to Kane; long keeping will also quite destroy it. It should therefore be prepared as required, and to obviate the boiling it would be better to dissolve the verdigris ℥j, in pyroligneous acid f℥j, and then add the honey.

Unguentum Cupri Subacetatis, D. *Unguentum Æruginis,* E. *Verdigris Ointment.*

Preparation.—D. Prepared subacetate of copper ʒss, ointment of white wax ʒviiss; mix intimately.

E. Verdigris in fine powder ℥j, resinous ointment ℥xv; mix.

Uses.—It is a good application to promote granulations in chronic ulcers; in applying it, care should be taken to place it only on the ulcerated surface, and not on the healthy skin, which it might injure; diluted, it may be used for ophthalmia tarsi, and to some chronic scalp eruptions. The D. preparation is less stimulating than that of E.

Cupri Acetas. Acetate of Copper. Distilled or Crystallized Verdigris.

$(CuO,C_4H_3O_3+HO=100.)$

Is obtained by dissolving verdigris in acetic acid, and crystallizing; it forms oblique rhombic prisms, of deep green colour, completely soluble in water, unlike the ordinary acetate. Its uses are similar to common verdigris, and it was formerly employed to prepare acetic acid; it is rarely used in medicine.

Cupri Carbonas. $(2CuO,CO_2+HO=111.)$ *Carbonate of Copper.*

Procured by adding together solutions of sulphate of copper and carbonate of soda; a pale blue flocculent precipitate falls, which when boiled becomes bright green, and dense.

It is employed by Devergie for impetigo and chronic eczema of the scalp, in ointment, made by mixing ʒij with lard ℥j.

Cupri Nitras. $(CuO,NO_5+3Aq.)$ *Nitrate of Copper.*

Preparation.—Dissolve copper in dilute nitric acid, and evaporate until it crystallizes on cooling.

It forms rich blue, oblique rhombic crystals, deflagrates violently when thrown on hot coals, and if wrapped up in tinfoil it becomes very hot, oxidizes the tin rapidly and throws out sparks of light. A strong solution of this salt is a valuable caustic for syphilitic primary ulcers, having the strange property of not corroding the surface unless it is abraded or ulcerated, and then by combining with the tissue it forms a deep eschar; it may be applied on lint moistened with it and wrapped round the part for one or two minutes; its application is very painful.

CHROMIUM. (Cr,=28.)

Chromium is a hard, greyish white metal, brittle, and exceedingly difficult to fuse, of dens. 5·9; it is scarcely acted on by the most powerful acids; it forms at least four compounds with oxygen similar to those of iron, the only one of medical interest is chromic acid CrO_3, which uniting with potash, produces a chromate and a bichromate of potash.

Chromic acid may be obtained nearly pure, by adding 100 measures of a cold saturated solution of bichromate of potash, to 150 measures of sulphuric acid, and letting the mixture cool; it forms brilliant crimson prisms, which must be carefully dried. Chromic acid is very deliquescent, and is at once reduced by contact with organic matter.

POTASSÆ BICHROMAS, D. ($KO,2CrO_3$=152.)

Bichromate of Potash.

The bichromate of potash is obtained in orange red, tabular crystals, derived from an oblique rhombic prism; it dissolves in ten parts of cold, or less of hot water, and is insoluble in alcohol; its taste is cooling, bitter, and metallic. Its local action is that of a caustic and irritant, producing on the hands of workmen who use it, an eruption of papulæ, which may become painful ulcers, and it has been employed as an application to warts, &c. If taken internally it is poisonous, sometimes acting as an irritant to the stomach and bowels, but usually causing paralysis and convulsions. In chemistry it is employed to obtain oxygen, and as a powerful oxidizing agent; for this purpose it is used in the preparation of valerianate of soda. D.

Antidotes.—Chalk, magnesia, and albumen. Emetics should be given.

Preparation.—The chromate of potash, KO,CrO_3 is first obtained by igniting a mixture of four parts of *native* chrome iron ore and one part of nitre, dissolving out the chromate of potash, and crystallizing. From this the bichromate of potash is procured, by adding sulphuric or nitric acid to a solution of the neutral chromate, and evaporating it until crystals form.

FERRUM. (Fe,=28.) *Iron.*

Iron is obtained in small quantity in the ashes of vegetables, and is an essential component of the blood; it is rarely found in the metallic state; combined with nickel it constitues the ærolliths or meteoric stones, which fall in a state of ignition from the air; as oxide it forms black and magnetic iron ores, red and brown hæmatite and micaceous iron; with sulphur it constitutes iron pyrites; with carbonic acid, clay iron ore and spathose iron; arseniates, phosphates, sulphates and other ores are also found, and few minerals are without traces of it. In Elba and Sweden the oxides are used, they only require heating with carbon to procure the metal; in England clay iron stone is principally employed, which containing silica, requires a flux to be also added, as clay or lime, to combine with the silica and form a slag; while molten iron flows out, which can be removed and purified by refining processes.

Pure iron crystallizes in octohedrons of a brilliant, whitish grey colour, dens. 7·8, it is soft, malleable, ductile, and flexible; fusing only at a very high temperature; at a white heat, it is easily welded; iron is the most tenacious of the metals, a wire one-thirtieth of an inch thick, supporting a weight of 60℔. *Cast iron* is much more fusible than pure iron but does not weld, and is brittle; it contains about five per cent of carbon, with other impurities. *Steel* has about one-and a half per cent of carbon in it, and is harder and more fusible than iron; it can be made brittle when suddenly cooled, or soft and less brittle with slow cooling; by regulating these states, or tempering it, the steel is procured of any degree of hardness required.

TESTS.—Are divided into those for protosalts and persalts of iron. A protosalt gives, with yellow prussiate of potash, a deep blue precipitate of Turnbull's prussian blue; with yellow prussiate of potash, a greenish white precipitate; and with hydrosulphuret of ammonia a black protosulphuret; but it is best to boil the solution and test as for a persalt.

Persalts of iron give, with yellow prussiate of potash, a precipitate of prussian blue; with red prussiate of potash, only a brownish green colour which is not distinctive; with sulphocyanide of potassium, a deep red solution; with tannin or tincture of galls an inky, or blueish black colour; and with hydrosulphuret of ammonia, a black sesquisulphuret.

EFFECTS.—Metallic iron seems inert, but readily oxidizing it may then acquire medical activity; the *Ferri Ramenta*, L. *Ferri Limatura*, E. Iron filings, are procured from smiths' work-shops, and usually purified by a magnet, which attracts the iron, and is said to leave any impurities; it does this imperfectly, the magnetic oxide or iron scales from smiths' forges, being also equally attracted with metallic iron; hence the only way of obtaining pure filings is by rasping a clear piece of iron with a steel file. They have been given as a tonic, and as a vermifuge for ascarides in doses of gr. x to xxx in electuary; they are also recommended as an antidote in poisoning by corrosive sublimate, or by sulphate of copper, to decompose these salts, and to deposit mercury or copper on the filings; but the application must be improper and injurious to a stomach already suffering from these corrosive substances.

Among the salts of iron, the sulphate and chloride are most active, and are capable of causing symptoms of irritant poisoning. Iron is considered tonic and astringent. Its preparations are most useful in anemic affections or those with deficiency of red blood globules, as chlorosis, passive hemorrhages, amenorrhœa, and scrofula; for tic doloroux and neuralgia, it is often prescribed with benefit, and in chronic enlargements of the spleen, Cruveilhier highly recommends its employment. As a tonic it is given in epilepsy, some dyspeptic affections, hysteria, Bright's degeneration of the kidneys, some forms of nervous palpitation, and valvular heart disease, chronic cutaneous eruptions, &c.; the late Mr. Carmichael advised iron for cancer, any benefit it causes in this malady must be derived from its tonic action. The continued use of ferruginous preparations colour the alvine discharges black; with some they readily produce throbbing and fullness of the head, feverish excitement and a tendency to hemorrhage, even if given in small doses; and their employment should be avoided in plethoric persons, or where there are active inflammatory symptoms.

Ferri Pulvis, D. *Iron Powder.*

Preparation.—Place in a gun-barrel as much peroxide of iron as will occupy about ten inches, confining it in the middle of the barrel by plugs of asbestos. Let the barrel be placed in the furnace used for organic analysis, one end of it being fitted by means of a cork into a bent adapter, whose further extremity dips in water; while the other end of the barrel is connected with a bottle containing zinc and water, with the intervention, however, of a dessication tube holding fragments of caustic potash, and a small bottle half filled with oil of vitriol. When thus arranged, a little vitriol is poured into the bottle with the zinc and water, to develope enough hydrogen to expel the air from the interior of the apparatus; as soon as this is accomplished, the part of the tube containing the peroxide of iron must be brought to a low red heat, by surrounding it with ignited charcoal, and then vitriol is to be gradually added to the zinc, to cause a steady current of hydrogen to pass through the oil of vitriol and dessication tube into the gun-barrel. As soon as the reduction of the oxide is completed, which may be judged to have taken place, when the gas bubbles escape at apparently the same rate through the water in which the adapter terminates, and through the bottle holding the vitriol, the fire is to be removed, (a slow current of hydrogen being still continued,) and when the barrel has cooled, its metallic contents should be extracted and kept in a well stoppered bottle.

This preparation was introduced by M. Quevenne, under the term of "*Fer Reduit*;" he prepared it as in the formula of D., by passing dry hydrogen gas over heated peroxide of iron, in an iron or porcelain tube which removes all its oxygen, leaving a light grey metallic powder, minutely divided, and said to be very soluble in the secretions of the stomach. Soubeiran prefers forming it from the oxide left on calcining oxalate of iron; it requires a carefully regulated heat, as too little does not reduce the iron, and too much agglutinates it into ductile masses.

Dose.—Gr. ij to xij in electuary or pill; the latter becomes very hard when kept for any length of time.

FERRI OXYDUM MAGNETICUM, D.
FERRI OXYDUM NIGRUM, E.
(Fe_3O_4 or $FeO,Fe_2O_3=116$.) *Magnetic Oxide of Iron.*

The black or magnetic oxide of iron is found in masses termed native loadstone, or in octohedral crystals; as prepared it is a fine greyish black powder, strongly attracted by the magnet, and soluble in hydrochloric acid without effervescence, it contains about seven per cent of water.

Preparation.—D. Convert sulphate of iron ℥viij, into a persulphate as directed in the formula for *Ferri Peroxydum Hydratum*, to this solution add sulphate of iron ℥iv, dissolved in distilled water Oss, and mix all well, with solution of caustic potash f℥54; boil for five minutes in an iron vessel, collect the precipitate on a calico filter, and wash it with boiling distilled water until the washings cease to precipitate with chloride of barium; lastly dry the precipitate by a steam or water heat, finely powder, and keep it in stoppered bottles.

E. Dissolve sulphate of iron ℥iij in boiling water Oiss, add commercial sulphuric acid ʒij ℈ij, boil and add by degrees, pure nitric acid ʒiv, boiling briskly after each addition for a few minutes; then dissolve sulphate of iron ℥iij, in boiling water, mix the two solutions, and immediately add stronger aqua ammoniæ f℥ivss, in a full stream, stirring the mixture at the same time briskly, collect the precipitate on calico, wash it with water till the washings scarcely precipitate with nitrate of barytes, and dry it at a temperature not above 180°.

In this process, (proposed by Wohler,) by boiling some of the sulphate of protoxide of iron with nitric acid, it becomes a sesquioxide, nitrous fumes escaping, and sulphuric acid uniting with the sesquioxide, prevents a basic sulphate being deposited; to this solution, mixed with some protosulphate of of iron, potash (ammonia, E.,) being added, a mixture of hydrated protoxide FeO, and sesquioxide Fe_2O_3, fall and unite while precipitating, to form the magnetic oxide Fe_3O_4; washing with water removes the soluble sulphate of potash produced, D. (Sulphate of ammonia, E.)

A magnetic oxide of iron was directed in Ph. D., 1826, to be made by washing and drying the scales of wrought iron found at smiths' anvils, removing their impurities by the attraction of a magnet, and powdering them as in the mode of making prepared chalk; these scales vary in composition, Mosander states that the outer layers contain four of protoxide to one of sesquioxide of iron, and the inner have six of protoxide to one of sesquioxide.

PURITY.—It should be "dark greyish black; strongly attracted by the magnet; heat expels water from it; muriatic acid entirely dissolves it; and ammonia precipitates a black powder from this solution, E."

USES.—It is a good tonic chalybeate, although seldom employed; formerly it was prescribed under the term ethiops martis.

DOSE.—Gr. v to xxx twice or thrice daily in electuary or powder.

FERRI PEROXYDUM HYDRATUM, D.
FERRUGO, E. *Hydrated Sesquioxide of Iron.*

This was proposed by Bunsen in 1843, as an antidote for arsenic; it should be of a deep reddish brown colour, when dried it constitutes red oxide of iron, but as an antidote, it is used in a soft gelatinous state; it is inodorous, insoluble in water and tasteless; it readily dissolves in dilute acids; if heated it gives off water, (some ammonia, E.,) and leaves according to Guibourt, about 286 grains of calcined sesquioxide from every pint of the moist mass, its composition is probably Fe_2O_3+2HO.

Preparation.—D. To distilled water f℥x, add pure sulphuric acid f℥vj, and in it dissolve with heat, sulphate of iron ℥viij; mix pure nitric acid f℥ss, with distilled water f℥ij, add it to the solution of sulphate of iron, and concentrate by boiling, until upon the sudden disengagement of much gas, the liquid passes from a dark to a red colour. Pour it then into a solution of caustic potash Oij, stir the mixture well, place it on a calico filter, and wash the precipitate with distilled water, till the washings cease to affect a solution of chloride of barium. Lastly, enclose the precipitate while in a pasty state, in a porcelain pot, whose lid is made air tight by a luting of lard, to prevent evaporation,

E. Dissolve sulphate of iron ℥iv, in water Oij. add commercial sulphuric acid f℥iijss, boil and add nitric acid of dens. 1380, f℥ix, in small portions, boiling the liquid for a minute or two after each addition, until it becomes yellowish brown, and yields a precipitate of the same colour with ammonia; filter, cool, and add in a full stream, stronger aqua ammoniæ f℥iijss, stirring briskly; collect the precipitate on calico, wash it well with water, till the washings cease to precipitate with nitrate of barytes; squeeze out as much water as possible, and dry the precipitate at a temperature not above 180°.

When kept as an antidote for arsenic, it preferable to preserve it in a moist state, after being simply squeezed.

In this process a sulphate of the sesquioxide of iron is first obtained, as in making the magnetic oxide, $2.FeO,SO_3+O+SO_3=Fe_2O_3 3SO_3$; on adding ammonia to this, sulphate of ammonia forms, and is afterwards washed out, while sesquioxide of iron falls in the hydrated state, in combination with a little ammonia. If potash as in D., or soda are substituted for ammonia, the result is said to be of inferior activity, requiring three or four times as much to decompose the arsenic; and if these alkalies are not added in excess, a basic sulphate is liable to form instead of a sesquioxide; while if an excess is used, a portion of it combines with the oxide.

USES.—Many strongly advise it as an antidote for arsenic; but the objections of Taylor (On Poisons, p. 86.) appear well founded; it is true that arsenic if dissolved, is precipitated by oxide of iron in a very insoluble form; acording to Graham as an arseniate of protoxide of iron ($2Fe_2O_3$ and $AsO_3=4FeO+AsO_5$); or Bunsen states, as hydrated subarsenite of oxide of iron ($4Fe_2O_3,AsO_3+5HO$); but this requires a great excess of the hydrated preparation, MacLagan asserts, at least twelve parts to one of arsenious acid, and Devergie 32 to one. The poison is, however, almost always taken in the solid form or in powder, in which state, iron has no action on it, which has been proved by the experiment of heating the hydrated peroxide and arsenious acid in water, and after a fortnight, although no arsenic was found dissolved in the liquid, a large portion was still undissolved and uncombined at the bottom of the vessel. Orfila has found the insoluble arsenite of iron itself to be poisonous, though excess of oxide of iron certainly diminishes its activity. Still the great deficiency is that this substance has no power of dissolving white arsenic, which is so heavy as to fall down on the mucous surface of the stomach, and adheres so closely that repeated vomiting will often fail to discharge it.

When arsenic is taken, it appears best to give mucilaginous and thick fluids to suspend it; then to use the stomach pump and vomit freely; and afterwards there can be no objection to give a table-spoonful of the hydrated peroxide of iron every five or ten minutes, until a large quantity is administered.

FERRI PEROXYDUM, D. FERRI SESQUIOXIDUM, L. FERRI OXYDUM RUBRUM, E.

Sesquioxide of Iron. ($\mathrm{Fe_2O_3}=80$.)

Termed also the red, or peroxide, of iron; rouge, crocus martis, and colcothar; it is found abundantly in various forms, constituting the specular ore, or iron glance of Elba, in masses as red and brown hæmatite, and diffused through many soils, and deposited around some springs, giving them a red or yellow colour. As prepared artificially, its appearance varies, the precipitated hydrated sesquioxide is light reddish brown, when dried it becomes dark brown, and if strongly heated, purplish or nearly black; it is not attracted by the magnet; is odourless and insoluble in water; when precipitated, its taste is ferruginous, but if calcined it has none; the *Ferri carbonas*, D. is essentially a similar preparation, with a small portion of carbonate of iron mixed with it.

Preparation.—It may be made as in Ph. D. 1826, by calcining sulphate of iron; sulphuric acid and water escape, with sulphurous acid derived from some vitriol which decomposes, and peroxidizes the iron; it is thus obtained as a residue in making Nordhausen, or fuming sulphuric acid, and used as a plate powder, termed rouge or crocus.

Or the rust that forms on iron wire moistened with water, may be rubbed off, reduced into fine powder and dried; this was the *Ferri rubigo* of D. 1826.

By precipitation from sulphate of iron, it is obtained in the following processes.

D. Place hydrated peroxide of iron in an oven, on a few folds of filtering paper, and when it has become dry to the touch, expose it in a covered crucible to an obscure red heat for a few minutes.

L. Dissolve sulphate of iron ℔iv, carbonate of soda ℔iv ℥ij, each in boiling water cong. iij, mix, and set aside that the powder may subside; pour off the supernatant fluid, wash the precipitate and dry it.

E. Dissolve sulphate of iron ℥iv, in boiling water Oss, add cold water Oiijss, and then add carbonate of soda ℥v, dissolved in about three times its weight of water; collect the precipitate on calico, wash it with water till the washings scarcely affect nitrate of barytes, and dry it in a hot air press or over a vapor bath.

The D. preparation affords a pure sesquioxide of iron, heat expelling any water from the hydrated sesquioxide. The L. and E. forms, yield a product similar to the *Ferri carbonas*, D. for the sulphate of iron and carbonate of soda decompose each other, forming carbonate of the protoxide of iron, which precipitates of a white colour, rapidly becoming green; by exposure to the air, in washing and drying, oxygen is absorbed, changing this protoxide into peroxide, while carbonic acid escapes, having no affinity for the latter. It is then a chocolate brown colour, and contains still from two to fifteen per cent of carbonic acid or as much as one third of unchanged carbonate, but it is usually calcined which removes this and renders it of a brownish red hue.

TESTS.—Dissolved in muriatic acid, it affords with yellow prussiate of potash, a deposit of prussian blue.

ADULTERATIONS.—Any carbonate of iron will effervesce on adding an acid; Orfila has found slight traces of arsenic in it, by boiling it with sulphuric acid, and using Marsh's test. "It should be totally soluble in muriatic acid with the aid of gentle heat, E." L. adds "with very slight effervescence, and is precipitated by ammonia."

USES.—Its effects are slight and due to its partial solution in the stomach; it acts as a tonic, alterative, and mild astringent, and may be prescribed for the same affections in which the other salts of iron are employed. In tic doloroux and neuralgic diseases it has been highly recommended, but like other remedies for neuralgia, it frequently fails; it may be given combined with quinine or cinchona powder. Mr. Carmichael used it for cancer, in which its tonic effects may occasionally do good, but it has no other power over the disease.

DOSE.—As a tonic in chlorosis &c., gr. x to xxx; in tic doloroux ʒss to ʒiv, in powder or electuary.

Emplastrum Ferri, D. E. *Strengthening Plaster.*

Preparation.—D. Burgundy pitch ℥ij, litharge plaster ℥viij, melt and add peroxide of iron in fine powder ℥j, stir until it stiffens on cooling.

E. Litharge plaster ℥iij, resin ʒvj, bees wax ʒiij, melt and add red oxide of iron ℥j, mixed with olive oil fʒiiiss. mix.

Spread on leather it is applied to yield support to fractured ribs, weak joints, and for lumbago and muscular rheumatism.

FERRI CARBONAS, D. ($FeO,CO_2=58.$)

Carbonate of Iron.

This is found native as clay iron ore and spathose iron; and is contained in carbonated chalybeate waters, which by exposure to the air, or by boiling, absorb oxygen and deposit red oxide of iron. If carefully prepared it is a white precipitate, which rapidly oxidizing becomes green, gives off carbonic acid, and is finally converted into a mixture of the brown sesquioxide with some carbonate of iron; it is insoluble in pure water, but dissolves in water charged with carbonic acid, and is thus found in chalybeate springs; in dilute acids it readily dissolves with effervescence, carbonic acid escaping.

Preparation.—Take sulphate of iron ℥viij, commercial carbonate of soda in crytals ℥x, dissolve each in distilled water cong. j, heat both solutions to boiling, mix them and let all rest in a covered vessel for six hours; remove the supernatant fluid with a syphon, drain the precipitate on a calico filter, and strongly express it; finally dry it at a heat not above 212°, powder and keep it in stoppered vessels.

On mixing these solutions, a sulphate of soda is formed and dissolves, while carbonate of iron precipitates; FeO,SO_3 and $NaO.CO_2 = NaOSO_3$, and FeO,CO_2; which by exposure to the air, losing its carbonic acid and absorbing oxygen, is in great part converted into sesquioxide of iron; and is the same preparation described under the latter name by L. and E. which see for its effects and doses.

USES.—Protosalts of iron are considered more active than per-salts, and of these the carbonate is most useful, from its ready solubility and mild action, but easily decomposing when exposed to air, it is difficult to employ it in medicine; sugar retards this change although it does not prevent it totally, hence the saccharine carbonate has become a favourite form for prescribing iron. The compound iron mixture and pill also owe their activity to carbonate of iron.

Ferri Carbonas Saccharatum, D. E. *Saccharine Carbonate of Iron.*

Preparation.—D. With sulphate of iron ℥viij, carbonate of soda ℥x, distilled water cong. ij, prepare as in the preceding formula, a carbonate of iron, and immediately after it has been expressed, mix with it refined sugar in fine powder ℥iv, dry the mixture at a heat not above 212°; then powder and keep it in stoppered bottles.

E. Dissolve sulphate of iron ℥iv, carbonate of soda ℥v, each in water Oij; mix, collect the precipitate on cloth, immediately wash it with cold water, squeeze out as much water as possible, and without delay rub the pulp which remains with pure sugar ℥ij, in powder; dry the mixture at a heat not much above 120°.

It is "a greyish green powder, easily soluble in muriatic acid, with brisk effervescence, E." Soubeiran states that it was suggested by

Dr. Becker, and prepared by M. Klauer of Mulhausen. Fifty grains should give seven and a half cubic inches of carbonic acid; Klauer considered it to be a definite compound of eighty of protoxide, with twenty of peroxide of iron; its taste is styptic and sweetish.

Dose.—Gr. v to xv.

Pilulæ Ferri Carbonatis, E. *Pills of Carbonate of Iron.*

Preparation.—Saccharine carbonate of iron four parts, conserve of roses one part, mix and divide into gr. v pills.

They should only be prepared as required.

Mistura Ferri Composita, D. L. E. *Compound Iron Mixture.*

Preparation.—D. Myrrh powdered ʒj, pure carbonate of potash ʒss, refined sugar ℥j, essence of nutmeg f℥j; triturate together, gradually adding rose water f℥vij, till an uniform mixture is obtained; to this add sulphate of iron ʒss, dissolved in rose water f℥j, and enclose the mixture at once in a bottle, which should be tightly corked.

L. E. Myrrh powdered ʒij, carbonate of potash ʒj, spirit of nutmeg f℥j; mix, and gradually add rose water f℥xviij, with sugar ʒij; lastly, add sulphate of iron powdered ℈ijss, and put all in a well stoppered bottle.

The carbonate of potash and sulphate of iron decompose each other, forming soluble sulphate of potash, and carbonate of iron which is suspended in the mixture; the quantity of carbonate of potash is nearly twice as much as is necessary, and its excess unites with the myrrh to form an emulsion. By exposure to air, the greenish colour, which the mixture has at first, is changed to brownish red, from its absorbing oxygen; when this occurs, it becomes useless, and should therefore be carefully preserved from the air, and prepared only as required.

Uses.—Its effects are similar to the other iron preparations; in addition, the myrrh renders it stimulating and more tonic; and the excess of potash confers on it the antacid and alterative powers of this alkali. It is frequently prescribed for hysteria, chlorosis, anæmia, and amenorrhœa; in phthysis and chronic rheumatism it is sometimes of service; but its stimulating effects render it improper, if there is any inflammatory action of the digestive organs.

Dose.—f℥ss to f℥ij.

Pilulæ Ferri Compositæ, L. *Compound Iron Pills.*

Preparation.—Myrrh in powder ʒij, carbonate of soda ʒj; rub together, and add sulphate of iron ʒj; mix again, add treacle ʒj, and beat all in a warm vessel, into a mass.

These pills are similar to the iron mixture; carbonate of soda, not being deliquescent, is substitnted for the carbonate of potash in the mixture, and by double decomposition, sulphate of soda and carbonate of iron form; the quantity of sugar is too little to preserve this, it soon oxidizes, and the pills become too hard for use, hence they should only be made as required.

Dose.—Gr. v. to xx, thrice daily; twenty grains are equal to one grain and three-fourths of the carbonate.

FERRI SULPHURETUM, D. E. (FeS,=44.)

Sulphuret of Iron.

There are several compounds of sulphur and iron; native iron pyrites, or mundic, is a bisulphuret, $FeS_2=60$, of the colour of brass, dens. 4·9, forming hard cubic crystals; of the other compounds, some are very instable, easily absorbing oxygen from the air, and changing into sulphate of iron. The artificial sulphuret is used to procure sulphuretted hydrogen; it varies in appearance, and is chiefly a protosulphuret, of blackish colour, with a yellow shining surface when freshly broken.

Preparation.—D. E. Heat iron nail rods to a full white or red heat, and rub them with sticks of sulphur, letting the melted sulphuret, as it forms, drop into a stone cistern filled with water; separate the product from the sulphur with which it is mixed, dry it, and keep in stoppered bottles.

E. An inferior sort, good enough for medical use, is made by heating one part of sulphur and three parts of iron filings, in a crucible in a fire, till the mixture begins to glow; then removing, and covering it until the action which at first increases considerably, ceases.

When heated, sulphur and iron rapidly combine, evolving much heat; some sulphurous vapours escape, and a protosulphuret of iron remains.

FERRI SULPHAS, D. L. E. ($FeO,SO_3+7Aq=139$.)

Sulphate of Iron.

Protosulphate of iron, green copperas, or green vitriol, is found occasionally in nature, and being soluble, is present in some springs, as Hartfell Spa in Scotland, and combined with alum it exists in the Moffat and Passy waters. Common green vitriol is made by roasting pyrites or bisulphuret of iron, and exposing it to air and moisture; it absorbs oxygen, forming a supersulphate of iron which dissolves out; to this, fragments of old iron are added to saturate its excess of acid, and by evaporation in lead boilers, the protosulphate is obtained in crystals; they are impure, containing some persulphate of iron, and sometimes copper. The purified sulphate for medical use, forms transparent, blueish green crystals, which are oblique rhombic prisms, dens. 1·82, of a styptic inky taste; 100 parts dissolve in 164 of cold, or 30 of boiling water, the solution exposed to air becomes reddish, taking oxygen until three-fourths of the iron is peroxidized; the crystals also readily absorb oxygen, effloresce slightly, and become covered by a reddish crust of basic persulphate of iron; if strongly heated, their sulphuric acid is expelled, and red oxide of iron remains.

Preparation.—D. Iron wire or turnings of wrought iron ℥iv, distilled water Oiss, place in a porcelain capsule; add commercial oil of vitriol f℥iv, and when the disengagement of gas nearly ceases, boil for ten minutes; filter through paper, separate the crystals which form after twenty-four hours rest, dry them on blotting paper upon a porous brick, and keep in a stoppered bottle.

L. Sulphuric acid f℥xiv, water Oiv, mix and add iron filings ℥viij; dissolve with heat, strain and crystallize.

E. If the commercial sulphate be not in transparent green crystals, without efflorescence, dissolve it in its weight of boiling water, acidulated with a little sulphuric acid, filter and crystallize.

TESTS.—Being a protosalt, it gives with red prussiate of potash a blue precipitate.

ADULTERATIONS.—If it contains sesquisulphate of iron, its colour is yellowish green, and yellow prussiate of potash forms prussian blue with it; if pure, it yields only a whitish precipitate. "Iron put into the solution does not precipitate copper. L."

USES.—In large doses as ℥ss to ℥j it acts as an irritant, and may cause death with colic, vomiting, and purging; in full medical doses it is liable to excite pain in the stomach, nausea, and an unpleasant feeling of fulness in the head, like other iron salts when they disagree; in moderate doses it is tonic and astringent, which renders it useful in passive hemorrhages, chronic catarrh, diarrhœa, long continued dysentery, leucorrhœa, and gleet; in powder it is used to check bleeding from small vessels, and in solution as an astringent lotion to ulcers and chronic ophthalmia, and as an injection for gleet. Velpeau has employed it in erysipelas, covering the inflamed part with lint, kept moist with a solution of one part of the sulphate to fifteen of water; when this cannot be easily applied, he uses an ointment of one part of the powdered sulphate to three or four of lard. It may be prescribed internally for any of the diseases in which iron is employed, as chlorosis, scrofula, &c.

DOSE.—Gr. j to v in pill; if given in solution, the water should be boiled to expel any air, which rapidly converts it into a persulphate; (Phillips). For ophthalmia, the lotion is composed of gr. j, or ij in f℥j; in gleet, gr. iv to x in f℥j; and for ulcers, ʒss to f℥j.

Ferri Sulphas Granulatum, D. *Granulated Sulphate of Iron.*

Preparation.—Form the sulphate of iron as already directed, after boiling the solution for the ten minutes, filter it through paper, into a vessel containing rectified spirit f℥viij, and stir the mixture as it cools, to get the salt in granular crystals; decant and drain these of the adhering liquid, and wash them on a funnel or small percolator with rectified spirit f℥ij, and when rendered quite dry, by repeated pressure between folds of filtering paper, and subsequent exposure for twenty-four hours below a bell glass on a common dinner plate half filled with oil of vitriol, let them be preserved in a stoppered bottle.

The object of this process is to obtain sulphate of iron free from any persulphate, and finely divided; care should be taken that the funnel dips into the spirit, for slight exposure to air injures it; its *dose* and *effects* are similar to ordinary sulphate of iron.

Ferri Sulphas Siccatum, D. *Ferri Sulphas Exsiccatum*, E.
Dried Sulphate of Iron.

Preparation.—D. Expose granulated sulphate of iron to an oven heat not exceeding 400°, until aqueous vapours cease to escape, then finely powder it and keep in stoppered bottles.

E. Moderately heat sulphate of iron in a porcelain or earthenware vessel not glazed with lead, till converted into a dry greyish white mass, and powder it.

The crystals lose by drying six atoms of water, retaining the seventh atom until decomposed; hence gr. iij are equal to nearly gr. v of crystallized sulphate.

Dose.—Gr. ss. to gr. iij.

Pilulæ Ferri Sulphatis, E. *Sulphate of Iron Pills.*

Preparation.—Dried sulphate of iron two parts, extract of taraxacum five parts, conserve of roses two parts, liquorice powder three parts; mix them into a proper mass and divide into gr. v pills.

Each pill should contain five-sixths of a grain of the dried sulphate.

Dose.—One to three pills.

FERRI SESQUICHLORIDI TINCTURA, D. L.
FERRI MURIATIS TINCTURA, E.
Tincture of the Sesquichloride of Iron.

The muriated tincture of iron or tincture of steel, is a reddish brown transparent liquid, of sour astringent taste, reacting as an acid; its odour is peculiar, and due to some hydrochloric ether which is formed in it.

Preparation.—D. Pure muriatic acid Oij, distilled water Oj, mix and pour it on iron wire ℥viij, and apply a gentle heat until the metal is dissolved; next add pure nitric acid f℥xviij, in successive portions, and then evaporate at a gentle heat until reduced to Oj; finally mix this in a bottle with rectified spirit Oiss, and after standing twelve hours, draw off the clear tincture.

Its dens. is 1237; if properly prepared, it should be a solution of the sesquichloride of iron; it contains about seventy grains of iron in f℥j, equivalent to 100 grains of sesquioxide, and is therefore at least three times the strength of the L. and E. preparation. In the process, a protochloride is first obtained, $Fe+Cl=FeCl$; which by the nitric acid is converted into the sesquichloride, combining with more chlorine, $2,FeCl+Cl=Fe_2Cl_3$, with the evaporation, the excess of acid is removed, and the resulting liquid diluted with spirit to form a tincture.

L. E. Sesquioxide of iron ℥vj, hydrochloric acid Oj, digest in a glass vessel for three days, frequently shaking; add rectified spirit Oiij and strain.

"Dens. about 992, giving about gr. xxx of sesquioxide of iron in f℥j. when decomposed by potash, Phillips." In this preparation, the oxygen of the red oxide unites with hydrogen of the acid to form water, and the iron combines with chlorine to form sesquichloride of iron, which dissolves in the spirit; $Fe_2O_3+3HCl=Fe_2Cl_3$ and 3HO.

IMPURITIES.—Its strength varies according to the dens. of the muriatic acid employed in making it, and frequently it contains a great excess of this acid; the quantity of oxide of iron it yields on adding potash, will show its strength. As a little carbonate is often found in the red oxide of iron used by L. and E., it causes the formation of some protochloride of iron, carbonic acid escaping with effervescence; and occasionally proof spirit is substituted for the spirit of wine, but improperly.

USES.—Sometimes it is applied externally as a caustic to warts, as a styptic to check oozing of blood from small vessels when divided, and as an astringent to ulcers. Internally, in large doses, it acts as an irritant, partly from the excess of acid usually found in it, and a man has died after six weeks from taking f℥iss. It may also produce irritation of the urinary system; some consider it has particular effects over this part, hence it is given in doses of gtt x, every ten or fifteen minutes, in spasmodic stricture; the nausea it causes may, however, explain its beneficial action; being discharged through the kidneys, it acts as a local astringent in passive hemorrhages and mucous discharges from these organs and from the bladder; or in gleet, while its tonic effects produce constitutional benefit. As a tonic, milder preparations are usually preferred ; it colours the fæces black, like other iron salts, and generally confines the bowels ; in scrofula, it is found of service occasionally.

ANTIDOTES.—Like the mineral acids.

DOSE.—Gtt x to xxx, in some mild fluid ; as much as f℥j or ij has been given.

FERRI AMMONIO-CHLORIDUM, L.

Ammonio-Chloride of Iron.

Also termed ferrum ammoniatum, it is in orange coloured, deliquescent, crystalline grains, of a saline astringent taste ; and considered to be a mere mixture of sesquichloride of iron fifteen parts, with muriate of ammonia eighty-five parts ; it yields about seven per cent of red oxide of iron, when decomposed with an alkali (Phillips) ; it dissolves in spirit and in water, and has a feeble odour when moist.

Preparation.—Digest sesquioxide of iron ℥iij, and hydrochloric acid Oss, in a proper vessel, in a sand bath, for two hours ; add hydrochlorate of ammonia ℔ijss, dissolved in distilled water Oiij ; strain, and evaporate the liquor, and rub what remains to powder.

A sesquichloride of iron is formed, and the sal ammoniac added to it ; as no change occurs, it is considered a mere mixture ; it was formerly made by sublimation.

TESTS.—Being a chloride, it gives a white precipitate with nitrate of silver, soluble in ammonia ; rubbed with caustic potash it evolves the odour of ammonia ; the iron it contains, with yellow prussiate of potash, forms prussian blue.

USES.—Formerly, under the name of flores martiales, it was given as a tonic in scrofula, and amenorrhœa, but is rarely employed now. It combines the effects of iron with those of sal ammoniac ; the latter, by the Germans, is considered a powerful alterative.

DOSE.—Gr. v to xx.

Tinctura Ferri Ammonio-Chloridi, L. *Tincture of the Ammonio-Chloride of Iron.*

Preparation.—Ammonio-chloride of iron ℥iv, proof spirit Oj ; mix.

A useless formula, rarely employed ; f℥j yields gr. 5·8 of red oxide of iron.

FERRI IODIDUM, D. L. E. ($\mathrm{FeI}+5\mathrm{Aq}=199$.)

Iodide of Iron.

This was introduced into medicine by Dr. A. Thompson; its solution is colourless, and has a strong but not unpleasant styptic taste; it can dissolve a large excess of iodine, becoming brown; if exposed to air it easily decomposes, absorbing oxygen to form red oxide of iron, which precipitates, while iodine is set free, colouring the liquid brownish, and producing, according to some, a sesquiiodide Fe_2I_3; a piece of soft iron wire is therefore usually kept in the solution, which by combining with the iodine as it is set free, preserves it colourless, and in the state of protoiodide. If carefully evaporated, avoiding the action of air, greenish, tabular, hydrated crystals may be got; in general the evaporation is carried on to dryness, it is fused by moderate heat, and cools into opaque, metallic looking, iron grey crystalline masses, which, as usually sold, are stated by Mr. Scholefield to contain from ten to fifteen per cent of water; for if made anhydrous by evaporation, it is liable to decompose.

Preparation.—D. Place pure iodine ℥j, filings or turnings of wrought iron, separated from impurities by a magnet ℥ss, distilled water f℥iv, in a florence flask; heat gently for ten minutes, and then boil till the solution loses its red colour, pass the liquid through paper into a second flask, washing the filter with distilled water f℥j, and with a regulated heat boil down the liquid till a drop of it taken out on the end of an iron wire, solidifies on cooling; when the flask has cooled, extract the iodide (by breaking the flask if necessary), and after it has been submitted to powerful pressure, enveloped in blotting paper, keep it in stoppered bottles.

L. Iodine ℥vj, distilled water Oiv, mix and add iron filings ℥ij; heat over a sand bath, and when it has acquired a greenish colour, pour off the liquid; wash the residue with boiling distilled water Oss, let the mixed and strained liquors evaporate at a heat not above 212° in an iron vessel, until the salt dries; keep it in closed vessels removed from the light.

E. With iodine, iron wire, and distilled water, proceed as in making *Syrupus ferri iodidi;* but before filtering the solution, concentrate it to one-sixth its volume, without removing the excess of iron wire; put the filtered liquid quickly into an evaporating basin with twelve times its weight of quick lime around the basin, in some convenient apparatus in which it may be shut accurately in a small space not communicating with the general atmosphere; heat the whole apparatus in a hot air press or otherwise, until the water be entirely evaporated, and keep the dry iodide in small closed bottles.

Of these, the D. form is preferable, they are all designed to yield a crystallized hydrated iodide of iron.

TESTS.—Strongly heated, it fuses, evolves violet fumes of iodine, and is decomposed; in solution, being a protosalt it gives with red prussiate of potash, a bright blue precipitate.

ADULTERATIONS.—"It should be quite soluble in water, or nearly so; forming a greenish solution, E."

USES.—It combines the properties of iron and iodine, and is used as a tonic and resolvent in scrofulous affections, tabes mesenterica, and swellings of the glands; for strumo-syphilitic diseases it is employed by Ricord and others with great benefit; in chlorosis and amenorrhœa, it has been found of service, but less stimulating preparations are frequently preferred. Like other iron salts it colours the alvine discharges black; it is also absorbed, and both iron and iodine can be detected in the urine, the secretion of which is increased.

In lotion it is prescribed for syphilitic and carious ulcers, and is used as an injection in leucorrhœa, ʒss to ʒj, being dissolved in water f℥viij; an ointment of it is also employed externally, consisting of ʒj, to lard ℥j, for glandular swellings.

DOSE.—Gr. ij gradually increased to gr. x, in solution, it may be flavoured with tincture of orange peel; when ordered in pill the following form of Mr. Leslie of Glasgow, can be used:—

Shake iodine gr. cxxvij, iron wire ℥ss, distilled water 75 minims, in a strong phial for about twelve minutes or until the froth becomes white; (wrap the bottle in a towel, lest it burst, as considerable heat is disengaged;) pour the liquid on white sugar in powder ʒij, mix and add powdered liquorice ℥ss, powdered gum arabic ʒiss, flour ʒj, and form into 144 pills; each contains gr. j of iodine, they are best kept in a bottle with finely powdered sugar.

M. Calloud gives the following formula for preparing iodide of iron pills extemporaneously:—Powder sulphate of iron in crystals gr. xxij, mix with iodide of potassium gr. xxvij, add bread crumb gr. xxx, and marsh mallow or liquorice powder enough to form twenty-two pills; each contains about gr. j of the iodide.

It has been also given in chocolate, lozenges, wine, &c., but perhaps its best preparation is the syrup.

Syrupus Ferri Iodidi, D. E. *Syrup of Iodide of Iron.*

Preparation.—D. Place pure iodine ʒv, iron turnings separated by a magnet ʒiij, distilled water f℥ij, in a glass flask and heat moderately until the solution loses its red colour ; filter it while hot into a bottle containing simple syrup f℥vj, and add distilled water to make up f℥viij. Each fʒj contains about gr. v of iodide of iron.

E. Dry iodine 200 grains, clean iron wire 100 grains, distilled water f℥vj, boil in a glass matrass, at first gently, to avoid expelling iodine, then briskly until about f℥ij remain ; filter quickly while hot into a matrass containing white sugar in powder ℥ivss, dissolve by gentle heat, and add distilled water if necessary to make up f℥vj.

Ten minims contain gr. j of iodide of iron ; "it is colourless or pale green, transparent, without sediment even when exposed to the air, E." Mr. Redwood states that it is liable occasionally to become solid, from the cane sugar when heated with the iodide becoming converted into grape sugar which crystallizes.

Dose.— Gtt x to fʒj diluted with water immediately before using it.

FERRI PERNITRATIS LIQUOR, D.

$(Fe_2O_3,3NO_5=242.)$ *Solution of Pernitrate of Iron.*

This is a dark, sherry brown coloured liquid, having a very astringent taste ; it is transparent, but by exposure to the air is liable to become turbid and deposit an insoluble subsalt ; when dried it yields a deliquescent mass, which decomposes if heated.

Preparation.—Into pure nitric acid f℥iij, diluted with distilled water f℥xvj, introduce fine clean iron wire ℥j, and leave them in contact till gas ceases to be disengaged ; filter and add distilled water to make its bulk Oiss. Dens. 1107.

Part of the nitric acid is decomposed, peroxidizing the iron and forming nitrous fumes which escape, $2Fe+NO_5=Fe_2O_3$ and NO_2 ; the sesquioxide of iron then unites with more nitric acid to form a nitrate, $Fe_2O_3+3NO_5$. This preparation was introduced by Mr. Kerr ; he employed a similar formula, but directed the addition of hydrochloric acid ʒj, to the solution when prepared, this has the effect of preventing its becoming turbid, which would otherwise be liable to happen in a few weeks.

USES.—Similar to the other salts of iron ; from its remarkable astringency it is a very valuable remedy in chronic diarrhœa and other mucous discharges ; it may also be used in uterine and intestinal hemorrhages, and for leucorrhœa ; and has frequently succeeded in checking diarrhœa when other remedies have failed. Locally it acts as a slight caustic, and has been applied to aphthæ ; diluted it may be employed in enemas and lotions.

DOSE.—Gtt x to ʒss twice or thrice daily in water ; for children gtt v to x.

TINCTURA FERRI ACETATIS, D. (Fe_2O_3+3 Acet.)

Tincture of the Acetate of Iron.

A preparation of this name was introduced into the former Ph. D. by Dr. Perceval, it contained iron in the state of a proto-acetate (acetate of the black oxide, Kane.) The present tincture is intended to be an acetate of the sesquioxide, it forms a deep brownish red solution, which when boiled, deposits red oxide of iron, and gives off acetic acid ; it tastes strongly ferruginous and acid.

Preparation.—To distilled water f℥ix, add pure sulphuric acid fʒvj, and with heat dissolve in it, sulphate of iron, ℥viij ; add nitric acid f℥ss mixed with distilled water f℥j, and evaporate to the consistence of a thick syrup ; dissolve this in rectified spirit Oij, and mix with acetate of potash ℥viij, also dissolved in rectified spirit Oij, shake repeatedly in a large bottle and throw all on a calico filter ; when any more liquid ceases to trickle through, press the filter and its contents, and having cleared the turbid tincture thus procured, by filtering through paper, let it be added to that already obtained. Dens. ·891.

In this process, a sulphate of the sesquioxide of iron is prepared as in making *Ferri peroxydum hydratum*, which see ; on the addition of the acetate of potash this is decomposed, an acetate of iron formed which constitutes the tincture, and a sulphate of potash which being insoluble in rectified spirit is removed by filtering,

USES.—Similar to the other preparations of iron, acting as a mild and agreeable tonic in chlorosis, &c.

DOSE.—Gtt xxx to ʒj, diluted.

FERRI PERCYANIDUM, L.

Prussian Blue.

Discovered accidentally in 1710 by Diesbach, a preparer of colours in Berlin ; it forms dark blue masses ; when broken these have a copperish tint, removed by rubbing which distinguishes it from indigo ; it has no smell or taste, and is insoluble ; the caustic alkalies decompose it, precipitating oxide of iron.

Preparation.—Mix ferro-cyanide of potassium with persulphate or perchloride of iron, and dry the precipitate. In commerce it is made by calcining blood, horns, and other animal matters with potash and iron filings, on washing this an impure yellow prussiate of potash is procured, to which a mixture of sulphate of iron one part, alum two parts is added, a dull greenish deposit falls, which washed in muriatic acid and exposed to air, becomes a deep blue, and is then dried.

By mixing the yellow prussiate and proto-sulphate of iron, sulphate of potash forms, which dissolves, and prussian blue precipitates; in commerce it contains alumina from the alum. It consists of Fe_7Cy_9, Berzelius considered it was composed of three parts of cyanide, with two of sesquicyanide of iron, or $3FeCy+2Fe_2Cy_3$.

Uses.—To make bicyanide of mercury. In America it is used in intermittent and remittent fevers, dysentery, and facial neuralgia, in doses of gr. iv to vj every four hours; the Germans employ it for epilepsy; in this country, being considered inert, it is rarely prescribed; an ointment has been applied to ulcers, and in some rare cases, it, or a similar blue compound, has been observed in Dublin as an excretion from ulcerated surfaces.

POTASSII FERROCYANIDUM, D. L. E.

(FeCy,2KCy+3Aq=212.) *Ferrocyanide of Potassium.*

The yellow or ferro-prussiate of potash is prepared by charring animal matters as blood, skins, &c., with carbonate of potash in iron vessels, it forms a pasty mass which is kept constantly stirred with iron rods; it is then cooled, dissolved in water, filtered, and by evaporation, large, lemon yellow, transparent crystals form, which are octohedrons with truncated edges and angles, of dens. 1·83; it is tough and flexible in thin plates, and dissolves in two parts of hot, or four of cold water; if heated to 212° it looses three atoms of water and becomes a white powder; more strongly heated it decomposes, leaving red oxide of iron and carbonate of potash.

Composition.—According to Liebig, it contains a radical, ferrocyanogen, composed of one atom of iron and three of cyanogen, or $FeCy_3$, combined with two parts of potassium and three of water, forming K_2FeCy_3+3Aq. It is usually considered a compound of one part of the cyanide of iron with two of cyanide of potassium, or $FeCy,2KCy+3Aq$.

Tests.—With persalts of iron it forms prussian blue; with salts of copper, a chocolate coloured ferrocyanide; with lead, a white deposit; and with zinc, a white ferrocyanide.

Uses.—As a test for these metals, and to prepare prussic acid. It seems to have little medical powers; D'Arcet swallowed ℔ss of it in solution without ill effects; it is rapidly absorbed, and can be detected in the urine from two to ten minutes after taking it, and when injected into one jugular vein of a horse it was found in the opposite one, within twenty to thirty seconds. It has been used as a sedative for erysipelas, chronic bronchitis, cephalalgia, &c.

DOSE.—Gr. x to xv, thrice daily.

FERRUM TARTARIZATUM, D. E.
FERRI POTASSIO-TARTRAS, L.
Tartrate of Potash and Iron.

It forms an olive brown, inodorous powder, of chalybeatetaste; exposed to moist air it deliquesces a little, it dissolves in about four parts of water, and slightly in alcohol; Soubeiran states that it contains thirty-one per cent of sesquioxide of iron, and Phillips about eighteen per cent.

Preparation.—D. From sulphate of iron ℥viij, prepare hydrated peroxide of iron, (which see,) and immediately after it is washed, place it with bitartrate of potash ℥v, and distilled water Oiss, in a porcelain capsule, apply heat, (taking care it does not rise above 150°,) and stir it occasionally for six hours; let the solution when cool be decanted off any undissolved oxide of iron, and having transferred it in small quantities to delf dinner plates, evaporate it to dryness, at a heat not above 150°; chip off the dry films and keep it in stoppered bottles.

L. Sesquioxide of iron ℥iij, hydrochloric acid Oss, digest for two hours in a sand bath, add distilled water cong. ij, set aside for one hour, pour off the supernatant fluid and add solution of potash Oivss, or a sufficiency, wash the precipitate with water, and while moist, boil it with bitartrate of potash ℥xiss, mixed in distilled water cong. j; if the liquid is acid to litmus paper, add solution of sesquicarbonate of ammonia Oj, or sufficient to saturate it; strain and evaporate with a gentle heat, so that the salt may remain dry.

E. Make rust of iron from sulphate of iron ℥v, and without drying, mix the pulpy mass with water Oiv, add bitartrate of potash ℥v ʒj, boil till the rust dissolves, cool and pour of the clear liquid; add to it carbonate of ammonia in powder as long as it causes effervescence. Evaporate over a vapour bath to a thin extract, or until it becomes a firm solid on cooling; keep it in closed vessels.

The D. form is similar to that of Soubeiran. L. obtains the hydrated peroxide by forming a sesquichloride of iron, and decomposing it with potash, the soluble chloride of potassium which also results, is washed out. When boiled with bitartrate of potash, tartrate of iron and tartrate of potash are obtained, and unite to form the double salt; the ammonia is added to prevent any excess of tartaric acid acting on, and reducing the salt to a protoxide of iron, (Kane.)

TESTS.—The iron is united in this salt so intimately that yellow prussiate of potash does not form prussian blue with it, unless an acid is first added; Geiger therefore considers it a ferrate of potash and tartrate of iron; the mineral acids precipitate red oxide of iron, soluble in excess.

ADULTERATIONS.—Sometimes being imperfectly made, it contains cream of tartar and red oxide of iron; it is then partly insoluble, and gives a blue colour with yellow prussiate of potash.

USES—Its slight taste renders it a useful tonic for children, it is but slightly astringent, therefore less likely to cause constipation; it is employed in scrofulous affections of the glands, bones, &c.; in renal dropsy it is of benefit as a tonic, and some consider it acts also as a diuretic.

DOSE.—Gr. v. to xxx in mixture or bolus; it is frequently given dissolved in Cape wine, which is preferable to sherry, the latter decomposing it.

Vinum Ferri, Ph. L. 1824. *Steel Wine.*

Preparation.—Iron filings ℥ij, sherry Oij; digest for a month, occasionally shaking it and filter.

The iron is oxidised by the air and water, and then dissolved by the acids of the wine. Mr. Phillips states that Oj contains twenty-two grains of sesquioxide of iron.

Dose.—fʒij to iv for scrofulous children, twice or thrice daily.

Donovan's Vinum Ferri.—Digest iron rust ℥ij, hock wine Oj, in a water bath at 100° for one hour, constantly agitating; place it in a bottle, and filter next day. *Dose.*—fʒij to iv.

FERRI AMMONIO-CITRAS, D.

Ammonio-Citrate of Iron.

Two citrates of iron are used medically; one, the citrate of the sesquioxide of iron; the other, usually termed ammonio-citrate of iron, a form for preparing which is given by D. They are obtained by the following processes:—

Citras Ferri. Citrate of Iron.

Preparation.—Dissolve moist hydrated peroxide of iron ℥viij, in a boiling solution of citric acid ℥iv, with water f℥xvj, adding more oxide than the acid dissolves; when cool, filter, evaporate by a water bath to the thickness of syrup; and dry it, spread on delf plates until it separates in scales.

It forms garnet coloured scales, slowly soluble in cold water, but readily dissolving in hot; and containing twenty-eight to thirty per cent of red oxide of iron; its solution reddens litmus paper. *Dose.*—Gr. ij to viij in pill or solution.

Ferri Ammonio-Citras, D. *Ammonio-Citrate of Iron.*

Preparation.—Convert sulphate of iron ℥v, into hydrated peroxide of iron; place it in a capsule with citric acid ℥iv, dissolved in distilled water f℥xvj, and boil for twenty minutes; when the solution has cooled, add solution of ammonia f℥iv, or in slight excess; place the solution thus obtained on delf plates, evaporate it to dryness by a steam or water heat, chip off the dry salt and keep it in stoppered bottles.

Mr. Redwood has given a formula for making this salt, which he states is preferable. Dissolve citric acid ℥iv, in twenty times its weight of water, add iron nails ℥ij, and gently heat till effervescence ceases, and no more iron is dissolved, replacing the water as it evaporates; filter and add slight excess of solution of ammonia, evaporate to the thickness of syrup, and dry it on delf dishes.

This salt forms thin, ruby coloured scales, is neutral to test paper, soluble in water, and nearly insoluble in spirit; it tastes sweetish and milder than the citrate, if exposed to the air it deliquesces; it contains about thirty-four per cent of the red oxide.

USES.—It is prescribed in chlorosis and strumous diseases, where a very mild chalybeate is required; it has little or no astringency.

DOSE.—Gr. iij to x in water or aromatic infusions; tincture of orange peel improves its flavour, and is usually added to it.

The Chalybeate Water of Bewley and Evans is a solution of citrate of iron thirteen grains and a half, in water f℥vj, charged with carbonic acid, and flavoured with syrup of orange peel. *Dose.*—f℥ss to f℥ij twice or thrice daily; it is an agreeable mode of giving this preparation.

Ferri et Quinæ Citras. Citrate of Iron and Quinine.

Is made by combining four parts of citrate of iron, and one part of citrate of quinine; it forms greenish yellow scales, soluble in water, and given in doses of gr. ij to vi, where the combined action of quinine and iron is desired.

Ferri Lactas. Lactate of Iron.

Preparation.—Mix sour whey Oij, sugar of milk ℥j, iron filings ℥j, digest at 100° until the sugar dissolves, and then add some more of it;

when a white crystalline powder forms, the liquid contains enough lactate of iron; boil and filter into a closed vessel, on cooling the salt deposits in greenish white crystals, and partly as a crust, it should be washed with cold water, and quickly dried on blotting paper. By recrystallizing the crystals are made more pure. (Wohler.)

In this process, the caseine of the whey acting as a ferment, converts sugar of milk into lactic acid; the acid then dissolves the iron, water being decomposed, its hydrogen escaping, and its oxygen uniting with the iron. It may also be got by evaporating sour whey to one-fourth, filtering and saturating the clear fluid with milk of lime; heating 100 parts of the lactate of lime thus obtained, 200 of boiling water, and 90 of crystallized sulphate of iron; when dissolved, remove from the heat, express the fluid from the sulphate of lime that falls, and in a day or two crystals of lactate of iron are deposited from it; the salt thus obtained is white. (Soubeiran.)

It is odourless, has a weak chalybeate taste, and dissolves in twelve parts of boiling, or forty-eight of cold water; its colour is usually greenish white; by keeping, its solution rapidly absorbs oxygen and becomes yellowish. It was much praised, but does not seem preferable to other protosalts of iron.

Dose.—Gr. ij to v.

Ferri Phosphas, Ph. U. States. *Phosphate of Iron.*

Preparation.—Dissolve sulphate of iron ʒv, phosphate of soda ʒvj, each in water Oiv; mix and collect the precipitate, wash and dry it.

It is a white powder which absorbs oxygen, and becomes of a fine blue colour, insoluble in water, and having a chalybeate taste. It is prescribed for diabetes, amenorrhœa, scrofula, and rickets; Mr. Carmichael used it both externally and internally for cancer.

Dose.—Gr. v to x in powder or pill.

HYDRARGYRUM, D. L. E. (Hg,=101.)

Mercury.

Mercury or quicksilver was known to the ancients; the Arabians used it externally, and Paracelsus first gave it as an internal remedy among the Western nations, but some of its preparations were early employed in the East. It is found in Spain, Carniola, China, &c., as native or metallic mercury; combined with chlorine, as horn mercury; with silver as amalgam; or with sulphur forming cinnabar, which is its chief ore; from this it is obtained by heating along with lime, which removes the sulphur, and allows the mercury to distil over; or by roasting, the sulphur is changed into sulphurous gas, and the metal separated.

Mercury is white and inodorous, liquid at ordinary temperatures, of dens. 13·6; at 39° it freezes and forms octohedra, which are malleable, and at 662° it boils, producing a dense colourless vapour; even at ordinary temperatures mercury volatilizes, and if mixed with water they evaporate together in considerable quantities, if heated to 150°.

TESTS.—Soluble *subsalts* of mercury produce, with iodide of potassium, a greenish yellow subiodide; with potash or lime water, a black suboxide; and if heated with protochloride of tin, they yield metallic mercury.

The soluble *persalts* give, with iodide of potassium, a scarlet iodide soluble in excess, forming a clear solution; with lime or potash water, a yellow oxide; with ammonia, the white precipitate; and if boiled with a small quantity of protochloride of tin, they form a white deposit of calomel, while an excess of protochloride reduces the calomel to metallic mercury. Both sub and persalts give with sulphuretted hydrogen added in small quantity, a white chloro-sulphuret, with more sulphuretted hydrogen, this becomes dense black.

Heated with dry carbonate of soda in a tube, all mercurial compounds are reduced, and the metal sublimes in minute globules which run together when touched with a rod.

ADULTERATIONS.—It may contain tin, lead, and zinc, to which bismuth is usually added, as it forms a more soluble amalgam; their presence is suspected when the metal easily tarnishes or tails, that is, leaves a trail when a small globule is agitated on paper. "It should be dissipated by heat; soluble in dilute nitric acid; when boiled with hydrochloric acid, the acid when cold is not coloured, nor is anything precipitated from it by hydrosulphuric acid. L."

Hydrargyrum Purum, D. *Pure Mercury.*

Preparation.—Place commercial quicksilver ℔iij, in a small glass retort over the body of which a hood of sheet iron is supported, and apply the heat of a gas lamp, until two-thirds of the metal distils over. Boil this for a few minutes with pure muriatic acid f℥ss, distilled water f℥ij, and having by repeated affusion of distilled water, and decantation, removed all the acid, dry the metal in a capsule with heat.

Distillation leaves all impurities behind; the muriatic acid would remove any that might accidentally come over, and does not act on pure mercury.

USES.—Metallic mercury appears inert; it has been given in large doses to remove obstructions of the bowels, by its weight, but is highly objectionable in these affections, which usually depend on organic causes. Sometimes too it is acted on by the intestinal fluids and forms soluble compounds, causing profuse salivation and other dangerous consequences. Its vapour, absorbed or breathed for any prolonged time produces severe disorders; these are met in looking-glass makers, gilders, and others who handle much of the metal; and its manifest effects in vapour seems to explain the activity of mercurial ointment, and other preparations which contain it minutely divided, in which state it is easily vaporized, and must possess decided powers independant of the occasional presence of any oxide to which some ascribe their action. From exposure to mercurial fumes, a palsy, or *tremblement metallique* may arise, with shaking of the muscles of the arms, the agitation increasing until it becomes convulsive; in one severe instance the man was violently agitated, when spoken to or aroused his limbs were thrown into spasms, and his voice became stammering and much impeded, he threw himself on his face in bed to check the trembling, but when undisturbed the agitation was less distressing; this disease may end in loss of memory, epilepsy, or apoplexy. Christison considers it easily, though slowly curable, yet many resist all treatment; they require removal from their employment, good diet, and tonics; iron is especially advised, and shower baths and electricity are useful.

Few drugs have more ills laid to their charge than mercury, and perhaps few can do more mischief if improperly used; but a great number of its alleged evils are without foundation, or much exaggerated. When given in moderate doses as gr. v of blue pill, thrice daily to persons in ordinary health, it generally causes about the second day some griping and looseness of the bowels; towards evening the gums are tender and a slight metallic taste is perceived, and on the third or fourth day increased discharge of saliva occurs; this may happen on the second day if the frequency of the dose be increased, or a smaller quantity used, as calomel gr. j every three or four hours. Among the other effects attributed to mercury are, feverishness before salivation occurs, with head-ache, quick pulse, and restlessness, it is not very common, and subsides when salivation is established; excessive salivation is seldom seen now, but was frequent when great quantities of mercury were given for syphilis, and sloughing of the gums, loss of the teeth and alveoli, swelling of the tongue, enlargement of the cervical glands, and adhesions in the mouth have been caused by it. Some are very susceptible of the action of mercury, and the majority that I have known thus affected were women of fair skin and delicate constitution; I have seen blue pill gr. ij cause decided salivation, though whenever severe symptoms follow the use of ordinary doses, it ought fairly to be attributed to idiosyncracy. Mercury is stated to cause cancrum oris or gangrene of the cheeks; it is a common disease among delicate children, particularly if over-crowded in workhouses, badly fed, and after suffering from febrile eruptions, as measles or scarlatina; and there is no doubt that anything causing increased action of the salivary glands, or tending to produce ulceration of the cheeks may be a starting point of this affection, but the great majority of these attacked by it have never used mercurials; the subject has frequently caused legal trials, therefore in attending delicate children it is well to abstain from employing mercury as far as possible, for if gangrene should arise in such a case, it at least will not be chargeable on the attendant; the odour of salivation, and the swelling of the gums are asserted to distinguish it from cancrum oris, but they cannot be relied on as diagnostic marks. Skin eruptions have been attributed to employing mercury, the only one it undoubtedly causes is eczema, described by Alley in 1810, as Hydrargyria; in one severe instance a man took a quantity of corrosive sublimate for syphilis, minute vesicles appeared over his whole body, attended with fever, great heat, and itching, they soon became yellow and opaque, and bursting, exuded a thick honey-like fluid; his head and face at this time were much swollen, and his eyelids edematous, the eruption gradually dried, and he recovered with desquamation of his entire cuticle, which was removed from his feet like a pair of boots; this eruption often arises as minute scattered vesicles, from using mercurial frictions, and if they are persevered in, it spreads over the neighbouring parts extensively; in these instances the ointment should be washed off with soap and water, and all mercury at once discontinued. Iritis and swelling of the testes have been ascribed to it, but on insufficient grounds; and mercurial sore throat, phagedena, periostitis, &c., are described; but syphilis is quite competent to cause these affections where a grain of mercury has not been used, and I have often seen the worst forms of phagedena, successfully treated by mercury, given until the gums were slightly affected; there are doubtless many cases which are benefitted by opium, quinine, conium, &c., and the local application of nitric acid, especially bad forms of sloughing sores, but they are few compared with the phagedenic ulcers for which mercury is a prompt and safe remedy. Erethysm is perhaps the worst effect of this mineral, Mr. Pearson first described it; there is great depression of strength, an anxious feeling about the præcordia, sighing, trembling, a small, quick, sometimes intermitting pulse, a pale countenance, and sense of chilliness, in this state any sudden exertion may be fatal; it is best treated by discontinuing the mercury, giving ammonia and other stimulants, and above all fresh air must be freely admitted day and night; this affection is now comparatively rare, and I believe is seldom seen, when the patients' gums are affected by the mercury.

When mercurials are continued for some time, they are undoubtedly absorbed, as Buchner and others have found them in the blood and secretions; and formerly, when it was used to excess, it has been discovered deposited in the metallic form in the bones, brain, and other parts of the body.

Mercury when combined with purgatives increases their action, by stimulating the intestinal secreting glands, and usually causing increased flow of bile; a favorite combination for this purpose is blue pill at night and the black draught next morning, or calomel with colocynth pill; mercurials are also often added as a vermifuge to purgatives, they do not seem to have any direct action, though perhaps by improving the secretions they may do good. Its greatest powers are manifested in checking the deposition of coagulable lymph, and causing its re-absorption, this is very evident in syphilitic iritis, and in disease it is always used when this effect is required, as in pneumonia, pleuritis, peritonitis, croup, meningitis, pericarditis, &c.; blood-letting, which promotes absorption, and itself checks the formation of lymphy deposits, aids its action, but appears less requisite now than formerly from the prevalence of low forms of inflammation; if the effused material be aplastic or of low adhesive nature, as tubercle, or pus, mercury is of little or no benefit. In affections of mucous membranes, with serous discharges, as bronchitis and diarrhœa, mercury is of less service than in the rarer cases where lymphy exudations form, such as croup, and some attacks of dysentery; for the latter disease, in warm climates it has been extensively used, and often with success, some employing it as a purgative, others for its constitutional effects. In acute laryngitis, or edema of the glottis, it is frequently beneficial, it may be prescribed in small alternate doses with tartar emetic, every half hour or so; when the edema is considerable, a small incision of the swollen epiglottis is often useful to discharge the serum, and may obviate the necessity for tracheotomy. For acute rheumatism, calomel and opium were strongly recommended by Drs. Hope and Hamilton, in ordinary attacks it seems useless, but when the peri, or endo-cardium is attacked, it is our best resource. In cholera, many physicians in India have advised mercurial treatment, and Dr. Ayre and others in England seem to have had considerable success with it during the late epidemic; some employ small repeated doses, others full doses as calomel ℈j, every half hour, for its sedative effects; when salivated they are stated usually to recover, but in the stage of collapse it is of little use. In fevers, unless some complicating inflammation be present, mercury is not employed in this country, in warm climates it has been found more beneficial. In dropsy, depending on Bright's disease of the kidneys, it is injurious, salivation often occurring very readily and severely in this disease; when effusions arise from inflammation, as serous apoplexy, or hydrothorax, it may sometimes give relief. For paralysis, amaurosis, severe head-ache, hydrocephalus, and some forms of sciatica, mercurials are often of great benefit. In synovial effusions, and the early stages of scrofulous morbus coxæ, they also do good. In syphilis, mercury was once supposed to be the only remedy, and even the necessary amount of daily salivation was described; it is now understood that almost every form of primary sore, or eruption, may be cured without it; but the opinion seems gaining ground, that a non-mercurial treatment is not so speedy, or at all so secure against relapses, as a moderate mercurial course. Mr. Carmichael supposed each form of venereal eruption had its peculiar primary ulcer; that the phagedenic sore and eruption were injured by mercurial treatment, and the scaly eruption and indurated or Hunterian chancre required it; it is now known that any venereal ulcer may be followed by any of these eruptions, or by the other forms, papulæ or pustules, which he described, and can be cured by mercury, and even phagedena is often benefitted by its judicious employment; at the same time, more care should be used than is generally thought necessary, in preparing for its exhibition, and in guarding against cold and excesses during its use.

HYDRARGYRUM CUM CRETA, D. L. E.
Mercury with Chalk.

Often termed grey powder, from its colour; most of the mercury in it is only finely divided, but about a quarter of a grain in 100 is said to be in the form of protoxide. (Phar. Jour. Vol. IV.) L. states it can scarcely be triturated so that no globules shall be visible; by heat its mercury vaporizes, and chalk remains as a white powder.

Preparation.—D. Pure mercury ℥j, prepared chalk ℥ij; mix in a porcelain mortar, till globules cease to be visible, and the mixture is uniformly grey.

L. E. Mercury ℥iij, prepared chalk ℥v; mix till globules are no longer visible.

D. contains gr. j of mercury in three grains; L. and E. are slightly stronger, gr. iij in viij.

USES.—A mild mercurial, often added to purgatives for children; the chalk renders it slightly antacid, hence it is used to improve the secretions of the bowels and liver; in diarrhœa it is often combined with rhubarb; as an alterative it is given in strumous affections, as for enlarged mesenteric glands; in the cutaneous eruptions of children, as herpes, &c., dried carbonate of soda, or small doses of James's powder may be added to it. To adults it may be given instead of blue pill; the form of powder is preferred, as if long made in pills, the mercury may be squeezed into globules by their drying.

DOSE.—Gr. v to xx for adults; gr. j to v for children; ʒj of the powder may be used for mercurial fumigation.

Hydrargyrum cum Magnesia, D. *Mercury with Magnesia.*

Preparation.—Pure mercury ℥j, carbonate of magnesia ℥ij; prepare as *Hydrargyrum cum Creta.*

Its *Uses* and *Doses* are similar to the last preparation, but from containing magnesia, it acts as an aperient with children, for whom it is chiefly prescribed.

PILULÆ HYDRARGYRI, D. L. E. *Mercurial Pill.*

Known commonly as blue pill, from its colour; the formula for preparing it was given by Barbarossa to Francis I. of France. It is usually made by steam power, as the extinction of the mercury is difficult, occupying two or three days to complete it; its rapidity is increased by adding some old blue pill, and some have recommended stearine for this purpose; if good, it ought to give no appearance of globules when rubbed on paper. About three-fourths of a grain in 100 is stated to be composed of oxide, and the residue of finely divided mercury with the other ingredients; gr. iij should contain gr. j of the metal.

Preparation.—Pure mercury ℥ij, confection of roses ℥iij; rub until all the globules disappear; then add finely powdered liquorice root ℥j, and mix well together. (Divide the mass into gr. v pills. E.)

ADULTERATION.—Often it does not contain the full proportion of mercury; and clay, coloured with prussian blue, has been found in it in large quantities; if the conserve of roses contains any sulphuric acid, added to brighten its colour, the irritating subsulphate of mercury will be formed; it may be guarded against by testing the conserve, its boiled and filtered solution should not precipitate with salts of barytes.

USE.—Doses of gr. v to xv frequently act as a purgative: Mr. Abernethy's combination of blue pill gr. v at night, and a senna draught next morning, is preferable; or it may be combined with purgative pill masses. It is often employed to produce the constitutional effects of mercury; or as an alterative in small repeated doses.

DOSE.—To cause salivation, gr. iv to v thrice daily, or gr. v in the morning, and gr. x at night; opium is often added to diminish the risk of purging. For children, it may be dried and rubbed into powder, or suspended with mucilage in a mixture. As an alterative, gr. j to iv may be given once or twice in the day.

UNGUENTUM HYDRARGYRI, D. L. E.

Mercurial Ointment.

Mercurial, or blue ointment, is always made in large drug houses, and by the aid of steam; the extinction of the mercury is facilitated by employing some old mercurial ointment; Soubeiran advises the use of lard, exposed in thin layers in cellars, for a long time; and stearine, or the fat of mould candles, is sometimes employed. Vogel asserts the mercury continues in the metallic state, except about one-five-hundreth part, which is oxidized; Christison, by melting the ointment in a long glass tube, has separated it into metallic mercury and a yellowish oil, which gave, with tests, clear evidence of containing mercury (thus sulphuretted hydrogen blackened it) to the extent, he calculated, of one part in 100, which he considers is united with fatty acids, and is the only active portion; from similar considerations, Mr. Donovan has proposed an ointment composed of one part of black oxide of mercury, heated with twenty parts of lard, for an hour; it is seldom employed.

Preparation.—D. Pure mercury, prepared lard of each ℔j; rub them together until metallic globules cease to be visible to the naked eye.

L. E. Mercury ℔ij, lard ℥xxiij, suet ℥j; rub the mercury, suet, and a little lard, until globules are no longer seen, then add the rest of the lard and mix.

"This ointment is not well prepared as long as metallic globules can be seen with a magnifier of four powers. E."

PURITY.—It should contain half its weight of mercury, but is often prepared with less, and colouring matters, as sulphuret of antimony, are then added to deepen its colour; the dens. of good ointment is about 1·77; by ether or turpentine its fat may be removed and the mercury weighed; boiling with liquor potassæ facilitates the removal of the last portions of fat.

EFFECTS.—It is seldom used internally in this country; in France, it is exhibited in pills by Cullerier, Sedillot, and others, and is said to act with certainty and rapidity. Externally, it is applied as a dressing to aid the absorption of tumors that are not malignant; and used to blistered surfaces in many diseases, where its constitutional effects are desired, as to the head in phrenitis, behind the ears for amaurosis, over the heart in pericarditis, the abdomen in peritonitis, to inflamed joints, &c.; for these purposes the blister should be dressed, if possible, once or twice with simple ointment, the cuticle then removed, and the mercurial ointment applied on lint; it is sometimes liable to cause irritation, if it is rancid or old, requiring its removal and the use of poultices. In frictions, it is perhaps the best mode of causing mercurial action, but is dirty, and often inconvenient; the usual place for rubbing it is the inside of the thighs, using each on alternate days; after three or four rubbings, the mouth generally becomes affected; the frictions should be long continued, and performed by the patient himself, in a warm room; or if by another, a glove should be used to protect him from its effects; the residue of the ointment is not usually removed until salivation occurs, but if it causes an eruption of eczema, it should at once be washed off; it may also be rubbed into the axilla, or over affected parts, as the liver, &c. Mercurial ointment was advised by the late Dr. M'Dowell, as an external application to erysipelas, to allay the heat, and check its extension; it is yet occasionally employed with these intentions.

DOSE.—Gr. ij to v in pill, with liquorice powder or soap; for frictions ʒj may be used every night; this usually salivates about the third or fourth day; if rapid action is required, ʒss may be used every hour or two, it usually salivates in thirty hours.

Unguentum Hydrargyri Mitius, L. E. *Milder Mercurial Ointment.*

Preparation.—L. Stronger mercurial ointment ℔j, lard ℔ij; mix.

E. Mercurial ointment may be diluted at pleasure, with twice or thrice its weight of axunge.

Uses.—To dress ulcers and blisters.

Ceratum Hydrargyri Compositum, L. *Compound Cerate of Mercury.*

Preparation.—Stronger ointment of mercury ℥iv, soap cerate ℥iv, camphor ℥j; rub together until incorporated.

Applied to indolent tumors, and chronic diseased joints.

Linimentum Hydrargyri Compositum, D. L. *Compound Liniment of Mercury.*

Preparation.—D. Ointment of mercury ℥j, camphor liniment f℥j; melt together with gentle heat, add solution of ammonia f℥j, and mix with agitation.

L. Camphor ℥j, rectified spirit fʒj; rub together; add lard ℥iv, stronger ointment of mercury ℥iv; lastly, pour in gradually solution of ammonia f℥iv, and mix them all.

Uses.—This is stimulating, and readily salivates; it is applied with friction over chronic tumors, &c. ʒj contains about gr. x of mercury. The D. form is now introduced, for the first time, into the Pharmacopœia; it affords a good liniment.

Emplastrum Hydrargyri, D. L. E. *Mercurial Plaster.*

Preparation.—D. Resin ℥ij, oil of turpentine f℥j, melt by heat; add pure mercury ℥vj, and rub together until metallic globules cease to be visible, and the mixture assumes a dark grey colour; then add litharge plaster ℥xij, previously melted, and stir the mixture constantly until it cools.

L. Heat olive oil fʒj, add sulphur gr. viij, and stir with a spatula until they unite; then rub mercury ℥iij, with them until globules are no longer visible, add lead plaster ℔j, melted with a slow fire, and mix.

E. Olive oil fʒix, resin ℥j, melt, and when cool, add mercury ℥iij, rub until the globules disappear; add melted litharge plaster ℥vj, and mix thoroughly.

By the D. form (now first ordered) the resin and oil of turpentine melted together, produce common or Venice turpentine, in which mercury is easily extinguished. L. uses some sulphur, which changes a little of the metal into sulphuret, the rest is merely divided.

It is applied as a resolvent, to glandular and other enlargements, spread on linen or leather.

Emplastrum Ammoniaci cum Hydrargyro, D. L. *Empl: Ammon: et Hydrargyri*, E. *Plaster of Ammoniacum and Mercury.*

Preparation.—D. Ammoniac plaster ℥iv, mercurial plaster ℥viij; melt with a steam or water bath, and stir constantly until it stiffens on cooling.

L. E. Heat olive oil fʒj, add sulphur gr. viij, stir with a spatula till united, then rub mercury ℥iij, with them until globules are no longer visible; lastly, gradually add ammoniacum ℔j, melted, and mix well.

Uses.—Similar to mercurial plaster, but more stimulating; it often causes an eczematous eruption.

HYDRARGYRI OXYDUM, L. (Hg_2O,=210.)

Suboxide of Mercury.

Is a black powder, odourless, insoluble in water and alkalies, readily dissolving in nitric or acetic acid; by light it decomposes into the metal and red oxide, becoming olive coloured; when heated it gives off oxygen, and mercury is sublimed, leaving no residue.

Preparation.—Chloride of mercury ℥j, lime water cong. j; mix and shake them; when the oxide subsides, pour off the clear fluid, wash the powder in distilled water, until nothing alkaline is perceived, and dry it, wrapped in bibulous paper, in the air.

The calcium of the lime takes chlorine from calomel, forming chloride of calcium, which dissolves; the oxygen of the lime and the mercury uniting, precipitate as suboxide, CaO and Hg_2Cl,=$CaCl$, and Hg_2O.

ADULTERATIONS.—It is sometimes grey coloured, from undecomposed calomel. "Digested for a short time with dilute hydrochloric acid, and strained, neither solution of potash nor oxalate of ammonia throw down anything. L." Potash, with the red oxide, would precipitate a yellowish hydrate; and any carbonate of lime present would give a white deposit with oxalate of ammonia.

USES.—Occasionally employed for fumigations, for which ʒj or ij may be prescribed daily; it is rarely used internally. In lotions, forming *Lotio nigra*, or *Black wash*, it is applied to venereal and other ulcers; this is made by adding calomel ʒj to lime water Oj; as the black precipitate is the only active part, it should be shaken when using it.

DOSE.—Gr. ss to gr. iij.

HYDRARGYRI BINOXYDUM, L. (HgO,=109.)

Red Oxide of Mercury.

This was prepared in Ph. D. 1826, by heating mercury at about 600°, in a glass flask with a long neck, until changed into red scales; the process occupied weeks, and the result was termed *Precipitate per se.*

Preparation.—L. Dissolve bichloride of mercury ℥iv, in distilled water Ovj, and add solution of potash f℥xxviij; pour off the clear fluid, wash the precipitate with distilled water, until nothing alkaline can be perceived, and dry it with gentle heat.

The chlorine and potassium form chloride of potassium, and the hydrated oxide precipitates, $HgCl$ and $KO = KCl$ and HgO. It is then a canary coloured powder, when dried becoming rather darker, of disagreeable metallic taste; dens. 11·0, very slightly soluble in water, dissolving in nitric or muriatic acid; and decomposed by heat into oxygen and mercury.

ADULTERATION.—If too little potash is used, the powder is of a brick dust colour, and contains oxychloride of mercury. "It is soluble in muriatic acid, and dissipated by heat. L."

USES.—Only to prepare oxygen and bicyanide of mercury. It is occasionally employed in lotion, forming the *Lotio flava, Yellow or phagedenic wash;* this is made by adding about gr. ij of corrosive sublimate to lime water f℥j, the oxide of mercury precipitates; but if more than gr. iijss of the sublimate be added, the result is a brown oxychloride. It is applied to syphilitic and irritable ulcers.

HYDRARGYRI OXYDUM RUBRUM, D. E.
HYDRARGYRI NITRICO-OXYDUM, L.
Nitric Oxide of Mercury.

Frequently termed red precipitate; it forms bright red, or orange yellow, inodorous, crystalline scales; in fine powder it is of a yellow colour; its taste is caustic and strongly metallic; boiling water dissolves it sparingly, in the proportion, Dr. Barker states, of ·62 parts in 1000; and Christison, of one in 7000.

Preparation.—D. Pure nitric acid f℥iij, distilled water f℥vj, mix and add pure mercury ℥viij, digest first with a very gentle heat, but when the action ceases, boil for a few minutes; decant the solution, and evaporate to dryness; powder the residue, place it in a shallow cast-iron pot, with a flat bottom, and loosely covered by a fire tile lid, and expose it to the heat of a slow fire, until red vapours cease to be given off; withdraw the heat, and when the pot cools, transfer its contents to bottles.

L. A similar process, using mercury ℔iij, nitric acid ℔iss, distilled water Oij.

E. Dissolve mercury ℥iv, in dilute nitric acid, of dens. 1280, f℥v, with moderate heat, and continue the heat until a dry salt is formed; rub this with mercury ℥iv, until a fine uniform powder be obtained; heat this in a porcelain vessel, and stir constantly until acid fumes cease to be discharged.

The mercury is oxidized by some of the nitric acid, which decomposes, evolving nitrous fumes; $2Hg$ and $NO_5 = 3HgO$ and NO_2. The oxide then unites with more acid to form a nitrate HgO,NO_5, which by the increased heat is divided into nitric acid NO_5 that escapes, and oxide of mercury HgO, that remains.

IMPURITIES.—It usually has some unchanged nitrate, this is detected by heat, which disengages nitrous fumes; if adulterated with red lead, it remains on strongly heating, while the red oxide of mercury is totally dissipated.

USES.—It is employed externally in fine powder to destroy soft warts and excessive granulations, and as a caustic to promote healthy action in foul ulcers.

Taken internally in quantity, it is an energetic poison, causing vomiting, cramps, purging, and sometimes salivation; death has ensued in forty-eight hours after taking it; and on examination the stomach and intestines are usually found inflamed, eroded in patches, and particles of the poison adhering to them.

ANTIDOTES.—None. Vomiting should be promoted.

Unguentum Hydrargyri Oxydi Rubri, D. *Ung: Hydrarg: Oxidi*, E. *Ung: Hydrarg: Nitrico-Oxydi*, L. *Red Precipitate Ointment.*

Preparation.—D. Red oxide of mercury in very fine powder ʒj, ointment of white wax ʒvij; mix.

L. Nitric oxide of mercury in fine powder ℥j, white wax ʒij, lard ℥vj; mix.

E. Red oxide of mercury ℥j, lard ℥viij; mix.

If kept, it decomposes, becoming greyish; it is applied to indolent and venereal ulcers, and in a more dilute form is employed in chronic conjunctivitis, and ophthalmia tarsi; for the latter affections, care should be used to reduce it to fine powder before adding the ointment, as its grains might produce troublesome eschars.

HYDRARGYRI IODIDUM VIRIDE, D. HYDRARGYRI IODIDUM, L. ($H_{G_2}I,=328.$) *Subiodide of Mercury.*

It is a greenish yellow powder, dens. 7·7, insoluble in water and alcohol, or in solution of common salt which separates it from the red iodide; it dissolves in ether; and by heat or exposure to light, is decomposed.

Preparation.—Rub pure mercury ℥j, pure iodine ʒv, in a porcelain mortar, occasionally adding a few drops of rectified spirit, until globules are no longer visible, and the whole assumes a yellowish green colour; dry it in a dark room, at a heat not above 100°, and keep it in a bottle impervious to light.

Rectified spirit aids their union, by dissolving the iodine; if much of it be made at a time, heat is generated, and even explosions may occur. It may also be procured by precipitating an acid solution of proto-nitrate of mercury, with iodide of potassium, but the process is troublesome.

USES.—It combines the effects of mercury and iodine; Ricord and Biett have used it in the syphilis of infants and venereal eruptions, and it is an effectual mode of treating condylomata, but is very liable to gripe, and should be well guarded with opium; as an alterative, it may be given in small doses, in scrofulous affections.

DOSE.—Gr. j to ij in pills for adults; from one-sixth to half a grain for children.

Pilulæ Hydrargyri Iodidi, L. *Pills of Subiodide of Mercury.*

Preparation.—Iodide of mercury ʒj, conserve of dog rose ʒiij, ginger powdered ʒj; mix.

Gr. v contains gr. j of the iodide; *Dose.*—Gr. v to xv.

Unguentum Hydrargyri Iodidi, L. *Ointment of Subiodide of Mercury.*

Preparation.—Melt white wax ℥ij, lard ℥vj, and add iodide of mercury ℥j.

Used for scrofulous and venereal ulcers, lupus, sycosis, and tubercular eruptions.

HYDRARGYRI IODIDUM RUBRUM, D.
HYDRARGYRI BINIODIDUM, L. E. (HgI,=227.)
Iodide of Mercury.

This is a scarlet powder of dens. 6·3, insoluble in water, but dissolved by alcohol, chloride of sodium, iodide of potassium, or corrosive sublimate; it is inodorous, and has a strong metallic taste; heated to 400°, it melts into a red liquid, and then sublimes in yellow crystals, which become red if kept for a time, or touched with any hard substance.

Preparation.—D. Dissolve by heat corrosive sublimate ℥j, in distilled water f℥xxv, and iodide of potassium ʒx, in distilled water f℥v, when both solutions are cold, mix them; collect the precipitate on a paper filter, wash it with distilled water f℥x; dry it at a heat not above 212°, and keep it in a closed bottle.

L. Rub together mercury ℥j, iodine ʒx, adding alcohol gradually until globules are no longer visible; dry the powder immediately with a gentle heat, without access of light, and keep it in a stoppered bottle.

E. Triturate mercury ℥ij, and iodine ℥ijss, together, adding a little spirit occasionally, until a uniform red powder be obtained; finely powder, and dissolve it in a concentrated solution of muriate of soda, cong. j, with the aid of brisk ebullition; filter if necessary through calico, keeping the funnel hot; wash and dry the crystals that form on cooling.

The boiling solution of salt, E. separates any subiodide, which is insoluble in it, and on cooling, the red iodide is deposited in crystals; the D. form is preferable, affording a finely divided precipitate; to obtain it of fine colour, a slight excess of iodide of potassium must be employed, but too much dissolves it.

TESTS.—Heated with potash in a tube, mercury sublimes, and iodide of potassium is formed, which remains behind.

ADULTERATIONS.—"It should be entirely vaporizable, soluble in forty parts of a concentrated solution of muriate of soda, at 212°, and deposited in fine red crystals on cooling. E." It may contain some subiodide, or red sulphuret of mercury, both of which are insoluble in the solution of salt.

USES.—A powerful irritant, producing effects similar to corrosive sublimate; it is used in ointment to scrofulous and venereal ulcers, and chronic glandular swellings, but may cause severe pain, and Rayer has seen erysipelatous redness produced by it. Internally, it is given in strumo-syphilitic affections, it requires great care, and is seldom employed.

DOSE.—The sixteenth, gradually increased to the fourth of a grain.

Unguentum Hydrargyri Iodidi Rubri, D. *Unguentum Hydrargyri Biniodidi*, L. *Ointment of Red Iodide of Mercury.*

Preparation.—D. Red iodide of mercury ʒj, ointment of white wax ℥vij.

L. Biniodide of mercury ℥j, white wax ℥ij, lard ℥vj, mix.

This is too strong, it should be much diluted for use.

CALOMELAS, D. E. HYDRARGYRI CHLORIDUM, L.

(Hg_2Cl,=238.) *Calomel.*

The chloride or submuriate of mercury is found as a mineral in Spain and Carniola; the Hindoos are said to have used it at an early period, and in Europe, Beguin described it in 1608; the term calomel, was employed by Sir T. de Mayern in 1655, its origin is involved in obscurity. Usually it is a fine powder, without taste or smell, of a white colour or light buff tint, which deepens on exposure to light, forming according to Dumas, metallic mercury and bichloride, or perhaps becoming a subchloride; dens. 7·2, Brande, (6·5, Kane.) It can be got in modified four-sided prisms; calomel is insoluble in alcohol or ether, in water it also seems insoluble, yet some assert that it is slightly dissolved by continued boiling, and others, that it is partly changed into bichloride.

Preparation.—D. Take sulphate of mercury ℔x, mercury of commerce ℔vij, incorporate them as completely as possible by prolonged trituration, add dry chloride of sodium in fine powder ℔v, and rub all together till a perfectly equable mixture is obtained. Heat this through the medium of sand, in a shallow iron pot, with a flat bottom, lined with clay, and covered with a cast iron lid, until the sublimate which attaches itself to a circular plug in the centre of the lid, (which can be removed, and cleaned from time to time,) neither exhibits minute globules of mercury, nor is rendered yellow when touched with a solution of caustic potash. Now let the whole cool, transfer the contents of the pot to a small hot hearth or oven whose door is made tight by a clay lute, and a regulated heat is to be applied, so as to cause the vaporized calomel to pass into an adjacent chamber of considerable size, on the floor of which it will accumulate as a fine white powder.

L. Boil mercury ℔ij, with sulphuric acid ℔iij, in a proper vessel, until the bipersulphate of mercury remains dry; when this is cold, triturate it with mercury ℔ij more, in an earthen mortar until perfectly mixed; add chloride of sodium ℔iss, and rub them together until globules are no longer visible, then sublime. Rub the sublimate to very fine powder, wash it carefully with boiling distilled water, and dry it.

E. Commercial sulphuric acid f℥ij ʒiij, pure nitric acid ℥ss, mix, and dissolve in them, mercury ℥iv, with a moderate heat; raise the heat so as to obtain a dry salt. Triturate this with muriate of soda ℥iij, and mercury ℥iv more, until the globules entirely disappear; heat the mixture in a sand bath, in a proper subliming apparatus. Powder the sublimate, wash it with boiling distilled water, until the water ceases to precipitate with iodide of potassium, then dry it.

In the D. and E. process, some sulphuric acid is decomposed, sulphurous fumes escaping, and the excess of oxygen, oxidizes the mercury; by E. nitric acid is employed for this purpose; the oxide of mercury then unites in both processes with sulphuric acid, and forms a sulphate, HgO,SO_3; when this is rubbed with mercury and chloride of sodium, and heated, sulphate of soda is produced, which remains in the vessel, and calomel sublimes. HgO,SO_3; Hg and $NaCl=Hg_2Cl$ and NaO,SO_3. It is usually made on a large scale, and sublimed in masses, which are then finely powdered; or according to Mr. Jewell's process, the calomel is condensed in a vessel filled with steam, and falls in a finely divided state, of a snow white colour.

TESTS.—Being a subsalt of mercury, it gives a black deposit with lime water; and a greenish yellow with iodide of potassium; on adding nitrate of silver to the fluid filtered from these precipitates, a white chloride of silver is formed, shewing it contains chlorine.

ADULTERATIONS.—From imperfect washing corrosive sublimate may be present, this will dissolve out with ether, and on filtering and evaporating, it remains and can be tested. "Heat sublimes it easily; ether agitated with it, filtered and evaporated, leaves no residue, or any that may be left, is not made yellow by aqua potassæ, E."

USES.—As a purgative, it is seldom given alone, usually being combined with other remedies, as jalap, rhubarb, or the purgative pill-masses; it increases their activity by stimulating the secretions of the liver and intestinal glands, and is therefore employed in jaundice and hepatic derangements, habitual or occasional constipation, cerebral affections, as apoplexy, paralysis, &c. As a vermifuge, it is prescribed for children, mixed with scammony or jalap, and it enters into most of the quack worm medicines, some consider it has a specific effect on these parasites, but it appears merely to expel the mucous and other accumulations in which they have their abode. In warm climates, it is used in large doses; for dysentery, cholera, and yellow fever, ℈j to ʒss, have been given every two, three, or four hours, or ʒij or iij, at one dose; it has the effect of allaying vomiting and purging, and is therefore termed a sedative; in England and here, enormous doses have been employed in cholera, and with even twenty to thirty drachms, taken in forty-eight hours, there has been little or no salivation; in much more moderate doses, Dr. Ayre strongly advised it in the late epidemic, and by some it was much prized, while some considered it useless, and even injurious.

Calomel is often added to promote the action of other medicines, as squill, elaterium, digitalis, or antimonials; as an alterative, it is employed in chronic skin diseases, chronic enlargements, old syphilitic affections, &c. for these it is frequently given in the form of Plummer's pill, or with antimonial powder. When used to salivate, opium is occasionally combined with it, to diminish its purgative effects; it may be prescribed in all cases for which mercury is thus employed, as to check acute inflammations, pleuritis, pneumonias, croup, &c., for syphilis, and to promote absorption in chronic affections; when the nervous system is engaged as in phrenitis or acute hydrocephalus, the addition of opium would be injurious, and antimonials, as James's powder are often substituted for it. In using calomel or any mercurial, acids should be avoided, as they are liable to cause griping.

Large doses of calomel may act as an irritant poison, this does not invariably happen; in disease, immense quantities have been taken with little or no injury, and a healthy girl who took ℥j of it by mistake, did not suffer for two hours, when the error was known she got lime water and emetics, and in half an hour discharged the greater portion of it, she had afterwards griping and tenderness of the abdomen, but recovered in four days without salivation. Still much smaller doses have ended fatally; a boy aged fourteen years died in three weeks from only gr. vj, and Taylor mentions an instance of gr. v, causing fatal salivation in an adult; these however appear due to some peculiarity of constitution.

DOSE.—As an *alterative*, gr. ss to gr. j every night or second night; to *salivate*, gr. ij to v, thrice daily, to this one-fourth of a grain of opium may be added; or a quarter of a grain to gr. j of calomel given every two hours, will rapidly affect the system; in young children, mercurial salivation is rarely produced, and some griping of the bowels and discharge of dark green stools, shews its constitutional effects on them; dose as a *purgative* gr. ij to x, combined with other aperients in pill or powder; as a *sedative* ℈j to ʒss every two hours, or even much more has been used.

Pilulæ Calomelanos et Opii, E. *Calomel and Opium Pills.*

Preparation.—Calomel three parts, opium one part, conserve of roses, a sufficiency; beat into a proper mass, and divide into pills, each containing calomel gr. ij.

Each pill contains two-thirds of a grain of opium.

Pilulæ Calomelanos Compositæ, D. E. *Pil. Hydrargyri Chloridi Comp* L.
Compound Calomel Pills.

Preparation.—D. Calomel ʒj, precipitated sulphuret of antimony ʒj, mix; add guaicum resin in powder ʒij, castor oil fʒj, and mix uniformly.

L. Calomel ʒij, oxysulphuret of antimony ʒij; mix, and add guaicum resin powdered ℥ss, treacle ʒij; mix.

E. Calomel, golden sulphuret of antimony, of each, one part, guaiac resin in powder, treacle, of each two parts; mix and divide into gr. vj pills.

Usually termed Plummer's pill; it is employed as an alterative and diaphoretic in chronic skin diseases, syphilis, hepatic affections, &c.

Dose.—Gr. v twice or thrice daily, or gr. x at night.

Calomel Ointment (Pereira.) Calomel ʒj, lard ℥j; mix. Recommended in herpes, impetigo, psoriasis, and lepra; with the addition of some camphor, Soubeiran uses it in eczema to allay the itching.

SUBLIMATUM CORROSIVUM, D. SUBLIMATUS CORROSIVUS, E. HYDRARGYRI BICHLORIDUM, L. (HgCl,=137.) *Corrosive Sublimate.*

Termed chloride, bichloride, oxy-muriate, or hydrochlorate of mercury, or commonly corrosive sublimate; it was prepared by Geber, in the eighth century, and has been long known in the East. It is met in semi-transparent, odourless, crystalline masses, or in small crystals, and sometimes in powder, of a white colour, its taste is strongly metallic, acrid and persistent; dens. 5·4; its crystals are right rhombic prisms, which fuse at 500°, and volatilize, forming an acrid vapour; it dissolves in three parts of hot, or eighteen of cold water, or in seven of cold alcohol, (2½ Kane.) Ether readily dissolves it; muriatic acid, common salt, or sal ammoniac, increase its solubility, the two latter, forming double salts with it. Sunlight readily decomposes its aqueous solution into calomel and muriatic acid, the presence of organic substances facilitates this change.

Preparation.—D. Sulphate of mercury ℔x, dried chloride of sodium ℔v, finely powder each, and mix them in a mortar carefully, place the mixture in an iron pot lined with clay, and apply a regulated heat, through the intervention of sand, and let the corrosive sublimate be sublimed into an earthen head, placed over the pot, and connected to it by means of lute. Keep the product in an opaque bottle.

L. Boil mercury ℔ij, with sulphuric acid ℔iij, in a proper vessel, until the bipersulphate of mercury remains dry; when cold, rub it with chloride of sodium ℔iss, in an earthen mortar, and sublime with a heat gradually raised.

E. Commercial sulphuric acid f℥ij ʒiij, pure nitric acid f℥ss, mercury ℥iv, dissolve with a moderate heat; then raise the heat so as to obtain a dry salt; triturate this thoroughly with muriate of soda ℥iij, and sublime in a proper apparatus.

By L. the mercury is oxidized at the expense of some sulphuric acid, sulphurous fumes escaping; in E. nitric acid oxidizes it, and nitrous fumes pass off; in both, the oxide of mercury then unites with sulphuric acid to form a sulphate (which D. employs ready prepared,) HgO,SO_3; when this is mixed with salt, and heated, they are both decomposed into sulphate of soda which remains in the vessel, and corrosive sublimate which sublimes. HgO,SO_3, and $NaCl=HgCl$ and NaO,SO_3. ℥xv of mercury yields about ℥xx of corrosive sublimate.

TESTS.—It reacts as a persalt of mercury, (which see,) and with nitrate of silver gives a precipitate of chloride of silver, soluble in ammonia. A galvanic current easily reduces it to the metallic state, as when its solution is dropped on gold, and the spot touched with a piece of iron; zinc will deposit it in a similar manner, upon bright copper.

ADULTERATIONS.—Not very liable to any; it has been sold mixed with sal ammoniac. "It sublimes entirely by heat, and its powder is entirely and easily soluble in ether. E."

USES.—In small doses it is employed as an alterative in chronic cutaneous eruptions, scrofulous affections, periostitis, and nervous painful diseases; for these it is often combined with vegetable tonics, as tincture of bark, or sarsaparilla; Van Swieten prescribed it for syphilis, its chief use now in this malady is for secondary affections, as nodes, nocturnal pains and old eruptions, for its alterative effects, but some consider it efficacious in all forms of the disease, which it can cure without salivation, causing only diaphoresis; Dzondi advises it in pills composed of corrosive sublimate gr. xij dissolved in water, with enough bread crumb and sugar added to form 240 pills, each contains one-twentieth of a grain of corrosive sublimate; dose, four daily, gradually increased.

Externally it has been used as a caustic, but is very dangerous. In solution it is applied in lotions to skin diseases, as acne, scabies, and lepra; the use of strong washes containing it is not free from danger, and I have known it to cause excessive pain and swelling of the leg, to which it was applied for eczema, with griping, vomiting, and diarrhœa, lasting for two days. It is employed as a collyrium in ophthalmia and venereal ulcers of the eye-lids, and as a gargle for syphilitic sore throat.

In large doses, it is a corrosive poison; it causes a strong metallic taste, burning heat and constriction of the throat, extending to the stomach, vomiting of stringy mucus and blood, with severe diarrhœa; the face is usually flushed, sometimes it is anxious and pale, symptoms of collapse afterwards arise, and syncope, convulsions, or insensibility precede death. Corrosive sublimate unites with the tissues, combining with the mucous membrane which becomes blueish grey, or sometimes slate coloured from the decomposition of the mercurial compound, and patches are found of intense inflammation in the stomach and bowels; three or four grains are probably a fatal dose, though persons have recovered after taking much more, thus, in one case ℥j was taken, but it was after a meal, and was soon ejected by vomiting; death usually happens in from one to five days, it has taken place in three hours, and if they live beyond two or three days, salivation usually arises.

ANTIDOTES.—Albumen (white of eggs) should be freely given, it forms a compound with corrosive sublimate, that is nearly inert; composed according to Geoghegan, Rose, &c., of about ten parts of oxide of mercury to ninety of albumen; in its absence, flour may be employed mixed in water, its gluten acting like albumen, and uniting with the poison; these have frequently proved effectual; a similar compound to the albumen and corrosive sublimate forms when the latter is allowed to act on the stomach, unchecked, from the poison corroding the mucous membrane. Iron filings have been advised, but are injurious from acting as a mechanical irritant; meconic acid which is also recommended, is practically useless, and whatever be given, the poison must be finally expelled by emetics or vomiting, as the stomach pump might do harm to the softened mucous membrane, if roughly used; the after treatment should be antiphlogistic, as symptoms arise.

DOSE.—As an alterative, from the sixteenth to the fourth of a grain, preferably given in solution, and after meals; in doses of a quarter grain it often gripes and disagrees. Externally, it is used in lotions from gr. ss to gr. iij, being dissolved in f℥j of water.

Liquor Hydrargyri Bichloridi, L. *Solution of Bichloride of Mercury.*

Preparation.—Bichloride of mercury gr. x, hydrochlorate of ammonia gr. x, distilled water Oj; dissolve.

This forms a soluble double salt; each f℥j contains gr. ss of corrosive sublimate. *Dose.*—fʒss to fʒij, in some diluent.

HYDRARGYRI AMMONIO-CHLORIDUM, D. L.
HYDRARGYRI PRECIPITATUM ALBUM, E.
Ammonio-Chloride of Mercury.

Usually termed white precipitate; was discovered by Raymond Lully in the thirteenth century; it is a white, colourless powder, sometimes in masses; its taste is at first earthy, then metallic; by heat it decomposes, forming calomel, nitrogen, and ammonia; boiled in water it produces sal ammoniac, which dissolves, and a yellow insoluble powder, composed of $HgCl+2HgO+HgAd$. (Kane.)

Preparation.—D. Corrosive sublimate ℥j, distilled water Oj; dissolve with gentle heat; pour solution of ammonia fʒix into the solution, and having stirred the mixture well, collect the precipitate on a filter and wash it with warm distilled water until the washings cease to precipitate with an acid solution of nitrate of silver; dry the product at a heat not above 212°.

L. E. Bichloride of mercury ℥vj, distilled water Ovj, dissolve by heat; when cold, add solution of ammonia f℥viij, stir frequently, wash the precipitate thrown down until free from taste, and dry it. (Collect it on calico and dry it. E.)

In this process, Kane considers two parts of corrosive sublimate and two of ammonia, interchange the elements of one equivalent of each, producing sal ammoniac in solution, and white precipitate; $2HgCl$ and $2NH_3$ (or 2.H.Ad. Kane); $=HgCl+HgAd$, white precipitate; and HCl,HAd, sal ammoniac.

Composition.—Mitscherlich considered it to be a compound of sal ammoniac and oxide of mercury, or $HgO+NH_4Cl$; Mr. Phillips, a compound of oxide and chloride of mercury, with ammonia, $HgO,HgCl,+2NH_3$; Sir R. Kane has found that it contains no oxygen, but is a chlor-amidide of mercury, or $HgCl+HgAd$.

TESTS.—It resembles calomel, from which it is distinguished by being unaltered by caustic ammonia, which changes calomel into the black oxide of mercury.

ADULTERATIONS.—Pereira has found it containing one-third its weight of sulphate of lime; starch and chalk have also been added to it; the tests of L. will detect them. "Totally evaporated by heat, when digested in acetic acid, iodide of potassium throws down nothing either yellow or blue; the powder rubbed with lime water does not become black; it dissolves in hydrochloric acid without effervescence; heated with solution of potash, it evolves ammonia." The iodide of potassium detects starch, or lead; the lime water tests any calomel; effervescence would denote a carbonate; and sulphate of lime would remain after heating.

EFFECTS.—Considered to be an irritant poison, and not used internally; it action is therefore little known. It is employed locally to cutaneous eruptions, as sycosis, herpes, scabies, impetigo, &c.

Unguentum Hydrargyri Ammonio-Chloridi, L. *Unguentum Præcipitati Albi*, E. *White Precipitate Ointment.*

Preparation.—White precipitate ʒj, lard ℥iss; mix.

HYDRARGYRI PERNITRATIS LIQUOR, D.

Solution of Pernitrate of Mercury.

By boiling mercury in nitric acid it is oxidized, nitrous fumes escaping from some of the decomposed acid; the oxide of mercury then unites with more nitric acid to form probably a neutral nitrate, HgO,NO_5; the solution is colourless, strongly caustic, has an acrid metallic taste, and changes the skin to a purplish hue when exposed to light; if the liquid is more concentrated than dens. 3·47, it evolves acid fumes, and deposits the bibasic nitrate of mercury in deliquescent rhomboidal plates, composed of $2HgO,NO_5+2HO$; if these crystals are washed with abundance of cold water they are converted into a yellow powder, the tribasic nitrate $3HgO.HO,NO_5$; when boiled in water this changes into a brick red, sexbasic salt $6HgO,+NO_5$.

Preparation.—Pure nitric acid f℥iss, distilled water f℥iss; mix, and add pure mercury ℥ij; dissolve by heat, and evaporate the solution to f℥ijss.

ADULTERATIONS.—If it contains any nitrate of the suboxide of mercury, it will give a white precipitate of calomel, with common salt.

USES.—A powerful caustic, employed to destroy malignant and phagedenic sores, lupus, &c.; and to ulcerations of the cervix uteri, when large and much inflamed; but for slight ulcers, the nitrate of silver is preferred, being milder and more manageable; it is applied on lint wrapped round a probe, or with a camel's hair pencil, the spot becomes white, an erysipelatous redness arises round it, and after a few days the scab that is formed falls off, usually leaving a granulating surface; severe pain may be caused by it, and even salivation has followed its use; it should be applied only to the affected part, as it will cauterize wherever it touches; a little lint is in general laid on the spot afterwards.

Unguentum Hydrargyri Nitratis, D. L. *Unguentum Citrinum*, D. E.
Ointment of the Nitrate of Mercury, or Citrine Ointment.

It should be golden yellow, of the consistence of butter, with an odour of nitrous acid; it frequently becomes very hard, and especially if mixed with other ointments, is liable to be changed of a grey colour, from the reduction of the nitrate into minute globules of metallic mercury; this may be prevented by adding a small quantity more of nitric acid, but it should not be spread with iron spatulas.

Preparation.—D. Pure nitric acid f℥j, distilled water f℥ss, mix, and dissolve pure mercury ℥j, by gentle heat; melt lard ℥iv, olive oil f℥viij, and while hot add to it the solution of mercury, also hot; next raise the heat of the mixture so as to cause effervescence, and then withdrawing the heat, stir with a porcelain spoon till it concretes on cooling.

L. Mercury ℥j, nitric acid fʒxj, dissolve, and mix while hot, with lard ℥vj, olive oil ℥iv, melted together.

E. Pure nitric acid, dens. 1380 to 1390, f℥ixss, mercury ℥iv, dissolve by heat; melt lard ℥xv, olive oil f℥xxxviijss, with a moderate heat, in a vessel capable of holding six times as much, and while hot, add the solution of mercury also hot, and mix thoroughly; if it does not froth up, increase the heat a little until this takes place; keep it in glass or earthen vessels, secluded from light.

By dissolving mercury in nitric acid, with heat, a nitrate of mercury forms; nitrous fumes escape, and the liquid also contains nitrous and nitric acids; when added to the lard and oil, these acids convert them into elaidine a white solid fat, and an orange red oil, which gives the ointment its colour and smell; nitric oxide and carbonic acid escape, according to Soubeiran (Schacht only obtained nitric acid vapour, with the strong odour of the ointment) causing the frothing, and the mercurial salt becomes mechanically mixed through the mass.

In preparing it, attention is necessary to have the acid of a proper density, or more of it must be added; Mr. Schacht has shewn that an excess of this is no disadvantage, for if the heat be applied long enough, it passes off; and further he has proved, that hard, discoloured, or even blackened ointment can be made again of proper colour and consistence, by heating it with more nitric acid. When large quantities are formed, a finer ointment is produced, apparently from the heat generated on mixing the acid and fatty matters; Mr. Alsop has found a heat of 190° is the best for mixing them, when the reaction is strongly produced, and much gas escapes. Some use neat's foot or rape oil, or lard alone, and some advise constant stirring as the mass cools, it aids the reaction, but is non-essential if enough of acid, and a proper heat be employed.

USES.—It is applied to chronic skin eruptions, and as a stimulating dressing to ulcers; and is frequently employed with benefit for psorophthalmia, smearing it on the lids with a camel's hair pencil; for all these purposes it is best used largely diluted with four to six parts of lard, wax ointment, or olive oil.

HYDRARGYRI BISULPHURETUM, L.
CINNABARIS, E. (HgS,=117.) *Sulphuret of Mercury.*

Vermillion or cinnabar was used as a paint by the ancient Egyptians, and many eastern nations, the Chinese especially have been long famous for making it. Cinnabar is found native in Idria, Almaden, &c., in acute rhombohedral crystals, for commerce, however, it is artificially prepared, principally by the Dutch; in mass it is crystalline, of dark, reddish brown colour; but in powder it is bright scarlet, having no taste or odour, dens. 8·1, insoluble in water and alcohol, fusible and volatile; in the air it burns with a blue flame forming sulphurous acid, and mercury volatilizes in vapour.

Preparation.—Sulphur ℥v, melt and add mercury ℔ij, continue the heat until the mixture begins to swell up, then remove the vessel and cover it closely to prevent the mixture taking fire; when the material is cold, powder and sublime it.

The mercury and sulphur combine, forming a black coloured sulphuret; by subliming this becomes a dark red mass, termed factitious cinnabar. To obtain the brilliant scarlet vermillion, cinnabar is finely powdered and exposed to strong sunshine, in flat dishes covered by a thin layer of water.

ADULTERATIONS.—Red sulphuret of arsenic, if present, is detected by boiling vermillion with caustic potash, supersaturating the filtered solution with nitric acid and adding sulphuretted hydrogen, which throws down orpiment, the yellow sulphuret of arsenic; red lead, red oxide of iron, or earthy impurities remain on evaporating cinnabar by heat, and the lead being decomposed, globules of that metal are obtained.

TESTS.—Heated with potash, globules of mercury sublime; and if muriatic acid be added to the residue, which is sulphuret of potassium, it disengages sulphuretted hydrogen.

USES.—For fumigating venereal ulcers of the throat, skin, fingers, toes, &c., by placing ʒss to ʒj on a heated iron, and conveying the fumes, which consist of mercurial vapour and sulphurous acid, to the affected part through a funnel; for the throat it is objectionable, as the sulphurous acid may excite cough and laryngeal irritation, and in one instance which I saw, this was very severe; mercury with chalk, or the oxide of mercury are therefore preferable. Mr. Colles advised cinnabar to be made into a candle with wax, on lighting the wax, its vapour is easily directed to any ulcerated surface.

HYDRARGYRI SULPHURETUM CUM SULPHURE, L.

Black Sulphuret of Mercury.

Frequently termed Ethiop's mineral, is a heavy, black, insipid, and odourless, amorphous powder, insoluble in water; it fuses when heated, and is totally dissipated; boiled in caustic potash water, a sulphuret of potassium forms, and a black powder remains, which becomes red when sublimed, and is cinnabar; hence Brande and Phillips consider this preparation a mere mixture of forty-two parts of sulphur to fifty-eight of cinnabar.

Preparation.—Rub sulphur ℔j, mercury ℔j, together, until globules are no longer visible.

ADULTERATIONS.—Charcoal, ivory black, or black sulphuret of antimony may be mixed with it, they are left on applying a moderate heat, which volatilizes the sulphuret of mercury.

USES.—Orfila and others consider it inert; it was thought to be an alterative and given in powder or electuary for glandular and cutaneous affections.

DOSE.—Gr. v to ʒss.

Hydrargyri Sulphas, D. ($HgO,SO_3=149.$) *Sulphate of Mercury.*

Preparation.—Commercial quicksilver ℥x, commercial oil of vitriol f℥vj; heat in a porcelain capsule until effervescence ceases, and nothing remains but a white and dry crystalline salt.

Part of the acid is decomposed into oxygen, which unites with the mercury, and sulphurous acid fumes that escape; the rest of the sulphuric acid then combines with the oxide of mercury to form a sulphate. It is an opaque white salt, becoming orange coloured at a dull red heat; at a stronger heat it is decomposed into mercury, oxygen, and sulphuric acid; water changes it into a soluble salt, and an insoluble basic yellow sub-sulphate, termed turpeth mineral.

Uses.—To form the sub-sulphate, calomel, and corrosive sublimate.

Hydrargyri Sub-Sulphas. ($3HgO+SO_3=367.$) *Sub-Sulphate of Mercury.*

Turpeth mineral is a heavy yellow powder, without odour, of an acrid metallic taste, taking 2,000 parts of cold, or 600 of boiling water to dissolve it,

Preparation.—Ph. D., 1826. Sulphate of mercury one part, warm water twenty parts; rub together in an earthen-ware mortar, pour off the supernatant fluid, and wash the yellow powder with warm water, as long as the decanted fluid gives a precipitate with caustic potash water, then dry it.

Water decomposes the sulphate of mercury into free acid, and an insoluble yellow basic sulphate.

Tests.—Boiled with liquor potassæ, the red oxide of mercury falls, and sulphate of potash forms in solution, with which barytic salts give a white precipitate.

Effects and Doses.—A violent and dangerous emetic in doses of gr. v, never used; an alterative in doses of a quarter of a grain to gr. j, seldom employed; gr. j, mixed with gr. v of snuff or starch acts as an errhine, and is occasionally prescribed to cause a mucous discharge from the nares in severe head-ache or chronic ophthalmia.

Hydrargyri Acetas. ($Hg_2O+C_4H_3O_3$,=261.) *Acetate of Mercury.*

This salt is in white, thin, shining scales, without odour, of an acrid metallic taste; sparingly soluble in cold water, and insoluble in alcohol. It was used from being the supposed active part of Keyser's anti-syphilitic pills; but Robiquet states that Keyser employed the acetate of the red oxide.

Preparation.—Ph. D., 1826. Mercury nine parts, dilute nitic acid eleven parts, dissolve and pour the solution into acetate of potash nine parts, dissoved in boiling water 100 parts, and acidulated with vinegar; filter quickly through a linen cloth, on cooling, crystals form, wash and dry them on paper with a gentle heat.

A subnitrate of mercury is obtained, which is decomposed by acetate of potash, acetate of mercury crystallizing on cooling, and nitrate of potash remaining in the solution; the acetic acid is used to prevent the formation of any yellow subnitrate of mercury.

Tests.—Heated with sulphuric acid and spirit of wine, the odour of acetic ether is perceived; by heating the salt alone, mercury is sublimed.

Dose.—Gr. j to v, rarely employed; Keyser's pills are composed of acetate of mercury gr. xij, manna ʒiij, divided into seventy-two pills.

HYDRARGYRI BICYANIDUM, L. (HGCY,=127.)

Cyanide of Mercury.

Was discovered by Scheele; it forms colourless, rectangular prisms, which are anhydrous, and occasionally opaque, its taste is disagreeably metallic, it is sparingly dissolved by alcohol, and is soluble in eight parts of cold, or much less of boiling water; when heated it gives off cyanogen gas, which burns with a violet flame, and globules of mercury sublime.

Preparation.—L. Percyanide of iron (prussian blue) ℥viij, binoxide of mercury ℥x, distilled water Oiv, boil together for half an hour and strain; evaporate the solution that crystals may form; wash what remains frequently with boiling distilled water, and again evaporate the mixed liquors that crystals may be formed.

In this process, cyanogen leaves the iron and unites with mercury to form the cyanide, which crystallizes; oxygen at the same time passes from the oxide of mercury to the iron, producing oxide of iron, which is separated by filtering; but the crystals are usually yellowish green, and impure, containing a little oxide of iron.

L. It may also be made by adding as much binoxide of mercury as will accurately saturate it, to hydrocyanic acid, distilled from ferro-cyanide of potassium, and dilute sulphuric acid. HgO and HCy,=$HgCy$ and HO.

TESTS.—When hydrochloric acid is added to a solution of this salt, it emits hydrocyanic acid, which is known by its smell and appropriate tests, (which see.)

USES.—It is employed occasionally to prepare prussic acid; and in France it is prescribed as an alterative and anti-venereal remedy, its effects resemble corrosive sublimate, to which Soubeiran prefers it as being more soluble, less easily decomposed by vegetable substances, and not liable to cause epigastric pain. Twenty grains have produced death in nine days, with salivation, ulceration of the mouth, purging, vomiting, and convulsions.

ANTIDOTES.—None, albumen does not decompose it; as soon as possible it should be removed by vomiting nad the stomach pump, the after symptoms are treated as usual.

DOSE.—The sixteenth to the fourth of a grain, in pill or solution.

MANGANESE. (MN,=28.)

Discovered about 1770, it is a greyish white metal, very infusible, dens. about 8·0; it is obtained from the oxide made into a paste with lamp black and oil, and strongly heated in a forge for two hours; in the air it absorbs oxygen, falling into a black powder. Manganese forms many oxides, the black or binoxide is alone contained in the Pharmacopœia.

MANGANESII PEROXYDUM, D. MANGANESII OXYDUM, E. MANGANESII BINOXYDUM, L.

Black Oxide of Manganese.

This occurs in various forms, when crystallized and pure, it is named prolusite, and with water it constitutes the ore called wadd. Broken in pieces and ground, it is sold as a fine black powder, without taste or smell, dens. 4·6 to 4·9, insoluble and nearly infusible; when heated it affords oxygen; with salt and sulphuric acid, it is used to evolve chlorine; and it is added to the ley in procuring iodine.

IMPURITIES.—It contains variable quantities of sulphate of barytes, earthy matter, oxide of iron, and limestone; its great utility in commerce renders it important to determine their amount, which is calculated from the bulk of chlorine or oxygen, that a given weight of the powder is capable of forming.

Uses.—In ointment, containing ʒj to ℥j of lard, it is applied to some skin diseases, as herpes, scabies, and prurigo.

Sulphate of Manganese.—MnO,SO_3+7HO. Is prepared for dyeing, by heating in a closed vessel, peroxide of manganese and coal; dissolving the impure protoxide thus formed, in sulphuric acid, and adding a little muriatic acid at the end of the process; by evaporating to dryness, and exposure to a red heat, the persulphate of iron in it is decomposed, and water dissolves out the sulphate of manganese from the oxide of iron. (Graham.) It is rose coloured salt, when anhydrous forming a white mass, soluble in two parts of cold water, and having a bitter metallic taste. It is given in doses of ʒj to ℥j, the latter are, however, considered excessive; this salt is said to purge within an hour or so, producing increased bilious secretion, and Dr. Ure has lately brought it forward, as likely to be useful in gouty affections.

PLUMBUM. (Pb,=104.) *Lead.*

Lead was one of the metals known to the ancients; its principal ore is the sulphuret or galena, from which it extracted by roasting in a reverberatory furnace for some time, at a dull red heat, by which much of the sulphuret is changed into sulphate; the entire mass is then well mixed and the heat raised, when the sulphate and sulphuret react on each other, forming sulphurous acid and metallic lead; PbO,SO_3 and $PbS=2Pb$ and $2SO_2$. There are also other ores of this metal, as the phosphate, carbonate, chromate, &c., but they are rarely used. Lead is a soft, blueish white metal, of dens. 11·4, soon tarnishing in the air and becoming oxidized; dilute acids act slowly on it, except nitric acid, in which it rapidly dissolves; it is malleable, but has little tenacity; at 612° it fuses, and may be got in octohedra by slowly cooling. In pure water, if air be excluded, lead is not acted on, but if air be present, the oxide, hydrate, and carbonate of lead are formed; hence, such water passing through lead pipes or cisterns rapidly dissolves the metal and becomes poisonous; Christison has shewn that the presence of sulphates, and chlorides in ordinary water diminishes or prevents the solubility of lead, forming in the pipes, &c., a deposit of insoluble sulphate and chloride of lead, which effectually protects the rest of the metal from being acted on, thus when the 2,000th part of salt, or 4,000th part of sulphate of lime is contained in the water, they prevent its dissolving any lead, and phosphates have even greater power in preserving the metal from being acted on.

TESTS.—The salts of lead form with iodide of potassium, a yellow iodide of lead dissolved by boiling water, and deposited in golden spangles as it cools; with bichromate of potash, they yield a yellow chromate of lead; and with alkaline carbonates, or sulphates, the white carbonate or sulphate of lead; sulphuretted hydrogen blackens its solutions, producing a sulphuret; and its salts heated with charcoal before the blow-pipe are reduced, giving metallic lead.

EFFECTS.—The metal itself appears inert, though most of its preparations are poisonous, and in small repeated doses may produce colic, convulsions, or paralysis; this chronic poisoning is liable to occur with persons using water, cyder, or other fluids contaminated with lead, or in painters, plumbers, &c., in the habit of employing it. Lead or painters' colic, termed colica pictonum, or the colic of Poictou, may begin suddenly, or be preceded by indigestion; there is griping pain, increased at intervals in the bowels about the umbilicus, and constipation, with the usual symptoms of colic. Dr. Burton has shewn that when lead is taken for any length of time, a blue mark is observed on the gums, around the teeth, and this is always found in those cases, which distinguishes them from ordinary colic. The paralysis usually occurs with those who have had colic already; the extensor muscles of the fore-arm are most commonly affected, causing drooping of the wrist, sometimes the part feels painful, and the muscles gradually become pale and wasted, particularly about the thumb; convulsions and apoplexy are also occasionally produced by lead. In large doses its preparations are irritant, and may give rise to symptoms of gastro-enterite, with cramps, vomiting, collapse, and even coma, the bowels in general are costive, though there may be severe purging, but acute poisoning from lead is rarely met. Dr. Thompson fancied the carbonate was alone poisonous, and that other salts of lead were converted into it in the system before causing dangerous effects; hence he advised acetic acid to be combined with the acetate in prescribing, to form a superacetate; it is now considered that any soluble lead salt may be the source of these injurious consequences.

ANTIDOTES.—In poisoning by lead salts, sulphate of soda, or of magnesia, or alum, should be given to form an insoluble sulphate of lead; and emetics then used to empty the stomach, as though insoluble, some consider the sulphate is not inert. For lead colic, purgatives, as castor oil are prescribed, followed by or combined with opium; and alum is employed by some as a specific remedy independantly of its decomposing the poison, it has been found very serviceable; baths of sulphuretted hydrogen are also recommended, they unite with the salts of lead on the skin, forming a black sulphuret which should be removed by a flesh brush; they thus prevent its absorption, and should be continued daily as long as this discoloration is produced. In paralysis from lead, the wrists are supported by splints, passive motion and galvanism used at intervals, blisters applied along the nerves, and stychnine given internally. To prevent chronic poisoning in lead manufactories, great cleanliness is recommended, with the daily use of lemonade, acidulated by sulphuric acid, which may convert any lead salts swallowed accidentally, into a sulphate.

OXYDUM PLUMBI, LITHARGYRUM, D. L. E.

(PbO,=112.) *Oxide of Lead.*

Oxide of lead or litharge was known to the ancients. When melted lead is exposed to a current of air it oxidizes, forming a yellowish green mass, used as a paint under the term *massicot*; when kept for some time, the mass breaks up into red or yellowish scales called *gold litharge* when of red hue, owing to the presence of red lead, and *silver litharge* when of lighter colour; Leblanc however states that the red tint is acquired by slow cooling, while if rapidly cooled, litharge remains yellow; it is nearly insoluble, of dens. 9·4; when heated it fuses, and with charcoal is easily reduced, giving off oxygen.

ADULTERATIONS.—None. "Fifty grains dissolve without effervescence in pyroligneous acid f℥iss; the solution precipitated by fifty three grains of phosphate of soda, remain precipitables by more of the test, E."; any effervescence would show the presence of a carbonate.

USES.—In fine powder it is sometimes sprinkled on excoriations, ulcers, and burns, as an astringent; its prolonged application might be injurious by its becoming absorbed; it enters into the composition of many plasters and lead preparations.

Plumbi Oxydum Hydratum, L. ($3PbO+HO$.) *Hydrated Oxide of Lead.*

Preparation.—Solution of diacetate of lead Ovj, distilled water cong iij, solution of potash Ovj, or as much as suffices to precipitate the oxide; mix, and wash the precipitate with water until nothing alkaline remains.

The potash and acetic acid form an acetate of potash which dissolves; the oxide of lead precipitating, combined with water as a hydrate of white colour; it re-dissolves in an excess of caustic potash water, and some chemists consider that it is not an oxide, but a sexbasic acetate. "It should totally dissolve in dilute nitric acid, L."

Used, in preparing sulphate of quinine, L.

Plumbi Oxidum Rubrum. (Pb_3O_4 *or* $PbO_2+2PbO=344.$) *Red Lead.*

Is obtained by heating litharge in a current of air at a temperature of 600°, so that the oxide may not be fused; it absorbs more oxygen, and forms a bright red powder, tasteless and insoluble, of dens. 9·0. When heated it gives off oxygen, protoxide of lead remaining; its composition is not uniform from containing variable quantities of the protoxide mixed with peroxide of lead; when acted on by dilute nitric acid, usually about sixty-five parts of the protoxide dissolve out, and thirty-five parts of brown peroxide remain.

Used.—To form aqua chlorinii. *Adulterations.*—Brick dust or red oxide of iron may be mixed with it; this is detected by boiling it in water with sugar and a little nitric acid, it dissolves, leaving the earthy matters. (Fordos.)

Plumbi Chloridum, L. ($PbCl=140.$) *Chloride of Lead.*

Is found native in the horn lead ore; as prepared it is a white, tasteless, crystalline powder, soluble in twenty-two parts of boiling water, and separating in small brilliant crystals on cooling, it requires 135 parts of cold water to dissolve in; when heated it fuses into a horny mass, hence it is termed horn lead. *Used.*—To prepare hydrochlorate of morphia, L., it has also been employed to allay pain in cancerous and nervous diseases, acting as an astringent and local anodyne; it is used in solution, ʒj of the salt being added to Oj of water, or in ointment containing ʒj to ℥j of lard.

Preparation.—Dissolve acetate of lead ℥xix, in boiling distilled water Oiij, and chloride of sodium ℥vj, in boiling distilled water Oj, mix the solutions; wash the precipitate when cold, with distilled water and dry it.

Chlorine from the common salt unites with lead, forming chloride of lead which precipitates; while acetic acid combines with sodium, and the oxygen, which passes from the oxide of lead, producing acetate of soda that dissolves and is removed by washing, PbO, Acet, and $NaCl$, $=PbCl$, and NaO, Acet.

PLUMBI NITRAS, D. E. ($PbO,NO_5=166.$)

Nitrate of Lead.

It forms usually opaque crystals, modifications of octohedrons, soluble in seven and a half parts of cold water; when heated, it decrepitates, then evolves a mixture of oxygen and nitrous acid gas, and leaves fused protoxide of lead.

Preparation.—D. Litharge in fine powder ℥v, place it in a porcelain dish, and add pure nitric acid f℥ij, distilled water Oiss, and with a sand heat, occasionally stirring the mixture, evaporate the whole to dryness; upon the residue boil distilled water Oiss, clear the solution by filtering, and having acidulated it with a few drops more of nitric acid, evaporate until a pellicle begins to form on its surface; withdraw the heat, and crystals will form when cooling, which should be dried on blotting paper in a warm atmosphere, and keep in a close bottle.

E. Litharge ℥ivss, dilute nitric acid Oj, dissolve the litharge to saturation, with the aid of a gentle heat, filter and set aside to crystallize; more crystals may be got by concentrating the residual liquid.

In this process, the oxide of lead and nitric acid combine to form a nitrate $PbO+NO_5=PbO,NO_5$.

Uses.—To prepare iodide of lead; a solution of ʒj of this salt in water f℥j, is Ledoyen's disinfecting liquid, it destroys the odour of sulphuretted hydrogen, but seems to have little or no power over infection; as an astringent it may be employed internally.

Dose.—Gr. one-fourth to gr. j twice or thrice daily, in pill or mixture.

PLUMBI IODIDUM, D. L. E. (PbI,=230.)

Iodide of Lead.

Is usually seen in a fine yellow powder, without smell or taste, soluble in 1235 parts of cold, or in 194 parts of boiling water, and as it cools, falling in golden yellow scales; acetic acid or alcohol also dissolve it; when heated, it fuses, partly volatilizes, and is then decomposed, evolving iodine in vapour.

Preparation.—D. Nitrate of lead ℥j, dissolve in cold distilled water Oj, mix with iodide of potassium ℥j, dissolved in cold distilled water Oss, remove the clear solution when the precipitate has subsided, and placing the latter on a filter, wash it with distilled water Oss; dry it at a heat not above 212°, and keep in a closed bottle.

E. Dissolve nitrate of lead ℥j, iodide of potassium ℥j, each in water f℥xv; mix, collect the precipitate on linen or calico, and wash it. Boil the powder with water cong. iij, acidulated with pyroligneous acid f℥iij, let any undissolved matter subside, keeping the heat near boiling; pour off the clear liquor, from which iodide of lead will crystallize on cooling.

L. Acetate of lead ℥ix, distilled water Ovj, dissolve and add iodide of potassium ℥vij, dissolved in distilled water Oij, wash and dry the precipitate.

By D. and E. nitrate of lead is added to iodide of potassium, nitrate of potash forms in the solution, and iodide of lead precipitates, KI and $PbO,NO_5=KO,NO_5$ and PbI. E. directs this iodide to be crystallized by dissolving it in boiling water, and again cooling, but the D. form is preferable, yielding a fine powder suitable for ointments. By L. acetate of lead is employed instead of the nitrate, and if pure, is unobjectionable; it however usually contains some subacetate, which causes an oxy-iodide to fall, PbO,PbI.

Tests.—Heated it evolves iodine, and the residue dissolved by nitric acid gives the reactions of lead.

Adulterations.—None of importance, "Gr. v should be soluble by boiling in pyroligneous acid fʒj diluted with distilled water f℥iss, and golden crystals are deposited on cooling. E."

Uses.—Its effects are little known; internally, it is employed as an alterative for chronic tumours, and externally applied in ointment to strumous enlargements, chronic and lupoid ulcerations, and enlarged glands. Dr. Simpson of Edinburgh has used this and other remedies, (as tannin, extract of belladonna, opium, mercurial ointment, oxide of zinc, &c.) made into balls with fatty matters, as local applications to the uterus, in diseases of that organ.

Dose.—Gr. iij to v or upwards, in pill.

Unguentum Plumbi Iodidi, D. L *Ointment of Iodide of Lead.*

Preparation.—D. Iodide of lead ʒj, ointment of white wax ʒvij; mix. L. Iodide of lead ℥j, lard ℥viij; mix.

PLUMBI CARBONAS, D. L. E. ($PbO,CO_2=134$.)

Carbonate of Lead.

White lead or ceruse is found naturally in crystals, forming white lead ore; in commerce it is always prepared artificially, and sold in masses like chalk, or more usually in fine powder, of white colour, heavy, tasteless, and insoluble in water, of dens. 6·25.

Preparation.—By mixing solutions of acetate of lead, and carbonate of soda, a neutral carbonate of lead precipitates, PbO,CO_2; but this is not fit for painting, being deficient in body, or opacity. The commercial carbonate is obtained by passing carbonic acid through a solution of subacetate of lead, or exposing sheets of cast lead to the fumes of vinegar, by placing them over earthen vessels containing it, and imbedded in tan, which rotting, heats the vessels, causing the acetic acid to vaporize and convert the lead into an acetate, which is changed into carbonate by carbonic acid evolved from the decaying oak bark; after five or six weeks it is removed, finely ground into a thin paste under water, well washed and dried for sale.

TESTS.—It dissolves with effervescence in acids, carbonic acid escaping, and the solution can be tested for lead.

ADULTERATIONS.— It is often mixed with impurities, especially sulphate of barytes or of lime, and chalk; the sulphates of barytes or of lime are insoluble in dilute nitric acid; chalk may be detected by dissolving the white lead in acetic acid, then precipitate all the lead by sulphuretted hydrogen, boil and filter the solution, and add oxalic acid, which deposits any chalk contained in it as an insoluble oxalate.

USES.—Carbonate of lead is not used internally; externally it is occasionally applied to excoriations as a dusting powder, but is dangerous, and has caused death by being absorbed; in ointment it is employed as a dessicant to burns and ulcers, when discharging much pus, and in plaster, to relieve local neuralgic affections. It is very liable to cause lead colic, Dr. Christison thinks, from its impalpable powder adhering closely to the mucous membrane, and therefore the greater certainty of its absorption; perhaps the readiness with which it forms soluble compounds, aids its action.

Unguentum Plumbi Carbonatis, D. E. *Ointment of Carbonate of Lead.*

Preparation.—D. Ointment of white wax ℔j, melt with gentle heat and add carbonate of lead in very fine powder ʒiij, and stir constantly until cool.

E. Simple ointment ℥v, white lead ℥j; mix.

PLUMBI ACETAS, D. L. E. ($PbO,C_4H_3O_3+3HO=190.$)

Acetate of Lead.

Also termed sugar of lead; it forms brilliant crystals, which are modified rhombic prisms, with dihedral summits; they are usually small, and broken down into a coarse powder, or in masses having an acetous odour; in dry air it effloresces slightly, and absorbing carbonic acid, forms some insoluble carbonate of lead; its taste is sweet and astringent; it dissolves in alcohol, or in two parts of water; heated to 136°, it gives off the water of crystallization; more strongly heated, it evolves carbonic acid and acetone; a sesquibasic acetate of lead remaining, which, if further heated, leaves a globule of metallic lead; its watery solution reddens litmus, but turns violet juice green.

Preparation.—L. Acetic acid Oiv, distilled water Oiv; mix, and add oxide of lead in powder ℔iv ʒij; dissolve by gentle heat, and strain; then evaporate the liquor, that crystals may form.

E. Uses pyroligneous acid, dens. 1034, Oij, distilled water Oj, litharge ℥xiv.

D. In the materia medica, to be bought prepared.

In this process, protoxide of lead uniting with acetic acid, forms the salt, $\mathrm{PbO+Acet=PbO,\ Acet}$; but for commerce it is always made by wholesale manufacturers, on an extensive scale.

TESTS.—Heated with sulphuric acid, it disengages acetic acid; by the tests for lead this metal is easily detected.

ADULTERATIONS.—It is usually sufficiently pure. "It should be entirely soluble in distilled water, acidulated with acetic acid; forty-eight grains thus dissolved are not entirely precipitated by a solution of thirty grains of phosphate of soda. E."

USES.—Acetate of lead is employed as an astringent in chronic diarrhœa and dysentery; for these diseases it may be prescribed in small repeated doses, or full doses as gr. x may be given twice or thrice in the day; in general the quantity directed is too little to produce its full benefits; for autumnal diarrhœa or English cholera, it is frequently of use combined with opium, and some place much reliance on it in Asiatic cholera; it is also given to diminish expectoration and diarrhœa in phthysis, but usually fails to afford relief, and its exhibition is advised for those forms of bronchitis attended with excessive secretion, to check the over abundant expectoration. In epistaxis, hæmoptysis, hæmatemesis, intestinal and uterine hemorrhages, the acetate of lead is much relied on to arrest the bleeding; in passive forms of hemorrhage, it may be given alone or with opiates, but when inflammatory symptoms are present, the usual antiphlogistic treatment must be combined with it, as purging, bleeding, &c. It is not so poisonous as is usually supposed, so much as gr. xviij have been given daily for eight or ten days without injury, but its long continued exhibition will cause all the symptoms of chronic lead poisoning, and some appear peculiarly susceptible of its effects; thus I have seen gr. vj given in divided doses cause slight colic and blue marks around the gums. Large doses as ℥j or ij produce a nauseous, sweet, but metallic taste, burning heat in the throat and stomach, vomiting, pain in the epigastrium, sometimes followed by severe colic, coldness, and prostration, and in some by cramps, giddiness, paralysis, and even coma. Externally, sugar of lead is used in lotions from its sedative and astringing powers, for sprains and superficial inflammations, also to check the excessive discharge of ulcers and burns, as an injection for gleet, leucorrhœa, and gonorrhœa, and as a collyrium in purulent ophthalmia; its long continued use in this affection, or its employment when the cornea is ulcerated, should be avoided, as Dr. Jacob has shewn its liability to form white indelible stains, which if on the cornea, might interfere with vision. In enema, dissolved in starch mucilage, acetate of lead is used with benefit to check the tenesmus of dysentery or of diarrhœa.

ANTIDOTES.—See lead.

DOSES.—Gr. j to x twice or thrice daily in pills or solution; vinegar is usually given with or after each dose, from Dr. Thompson's view, that it prevents the formation of a carbonate which he considered the only poisonous salt of lead; it is of service in aiding the solution of the acetate and rendering it easier absorbed; opium is often prescribed with acetate of lead, and decomposes a very little portion of it, forming acetate of morphia and meconate of lead, but not enough to cause the change to be important; vegetable infusions containing tannin, acids, or hard waters, should not be used as they are incompatible with the salt. For eye lotions or urethral injections ℈j to ʒss in distilled water f℥viij can be directed; for ordinary lotions, ʒij to vj of the salt may be dissolved in water Oj, and vinegar f℥ss added; in enemas from gr. x to xxx may be employed.

Unguentum Plumbi Acetatis, D. E. *Ceratum Plumbi Acetatis*, L.
Ointment of Acetate of Lead.

Preparation.—D. Ointment of white wax ℔j, melt with a gentle heat, and add acetate of lead in fine powder ℥j, stir until it concretes.

L. White wax ℥ij, olive oil f℥viij, melt and add acetate of lead powdered, ʒij.

E. Simple ointment ℥xx, melt and add acetate of lead in fine powder ℥j,

An astringent and cooling ointment applied to painful ulcerations, excoriations or discharging surfaces.

Pilulæ Plumbi Opiatæ, E. *Acetate of Lead and Opium Pills.*

Preparation.—Acetate of lead six parts, opium one part, conserve of roses one part, mix and divide into gr. iv pills. It may also be made with double the quantity of opium.

Each pill contains gr. iij of acetate of lead and gr. ss of opium.

Dose.—One or two pills.

PLUMBI SUBACETATIS LIQUOR, D.
Solution of Diacetate of Lead.

This preparation, termed Plumbi Diacetatis Liquor, by L. and Plumbi Diacetatis Solutio, by E. is usually known as extract of Saturn, or Goulard's extract, from M. Goulard who brought it into use about 1770; it contains a subacetate of lead in solution, $3PbO,C_4H_3O_3$, (Kane); or $2PbO,C_4H_3O_3+10Aq$, (Thompson). It is a transparent, colourless liquid, with a sweetish astringent taste.

Preparation.—D. Acetate of lead ℥vj, distilled water Oij, dissolve and heat to boiling, then add in successive portions, litharge in fine powder ℥iv, and boil gently for half an hour; add now as much distilled water as will supply what has been lost by evaporation, and filter through paper into a bottle, which should have an air tight stopper. Dens. 1066.

L. Acetate of lead ℔ij ℥iij, oxide of lead in fine powder ℔j ℥iv, water Ovj, boil for half an hour, frequently stirring, and when the liquor is cold, add distilled water, as much as will make up the quantity to Ovj, then strain. Dens. 1260.

E. Acetate of lead ℥vj ʒvj, litharge in fine powder ℥iv, water Oiss, proceed as in L. and preserve in closed bottles.

The acetate of lead unites with more oxide of lead to form a subsalt, which dissolves in the water. The three preparations vary very much in strength, thus L. contains 220 grains in f℥j; E. 172 grains in f℥j; and D. only 109 grains in the same quantity.

TESTS.—The same as for acetate of lead, from which it is distinguished by forming copious white precipitates with mucilage or carbonic acid.

ADULTERATIONS.—Unimportant, when made from ordinary vinegar, it is often of a brown colour.

USES.—In large doses, this solution is poisonous; it is not given internally; diluted it is prescribed as a lotion to inflamed parts, contusions, wounds, burns, or ulcers, being an astringent and sedative application; it may also be employed in ointment.

Plumbi Subacetatis Liquor Compositus, D. *Liquor Plumbi Diacetatis dilutus,* L. *Dilute Solution of Subacetate of Lead.*

Preparation.—D. Solution of subacetate of lead f℥ij, proof spirit f℥ij, distilled water cong. ss; mix, filter, and keep in stoppered bottles.

L. Solution of diacetate of lead fʒiss, proof spirit f℥ij, distilled water Oj; mix.

This is usually known as vegeto-water or Goulard's solution; the D. preparation is preferable, being slightly stronger than L. for it contains about 218 grains in Oiv, and L. only 165; it may however be employed with advantage even when more concentrated. The fluid should be colourless, but if made with common water, a milky deposit of sulphate, chloride, and carbonate of lead is caused by the salts in the water. It may be applied on lint as a lotion, or formed into a poultice with bread crumb.

Ceratum Plumbi Compositum, L. *Compound Lead Cerate.*

Preparation.—Wax ℥iv, olive oil f℥viij. melt and when they begin to thicken, add gradually solution of diacetate of lead f℥iij, stir constantly with a spatula until they cool; lastly with these mix camphor ʒss, dissolved in olive oil f℥ij.

Used for the same purposes as liquor plumbi, to ulcers, excoriations, burns, &c. it is commonly termed Goulard's cerate.

EMPLASTRUM LITHARGYRI, D. E.
EMPLASTRUM PLUMBI, L. *Lead Plaster.*

This is frequently termed diachylon, it forms the basis of several plasters, and is sold in rolls of a greyish or yellowish white colour; when heated it melts, and can be decomposed by increased temperature, giving out inflammable gasses, and leaving a charred residue from which globules of lead may be obtained. Ether separates lead plaster into a soluble oleate of lead, and an insoluble margarate of lead.

Preparation.—D. Litharge in fine powder ℔v, olive oil cong. j, water Oij; boil together over a slow fire, stirring constantly until the oil and litharge acquire such consistence that they will solidify on cooling; towards the close of the process, a little boiling water should be added to replace that which has disappeared.

L. Uses oxide of lead in fine powder ℔vj, olive oil cong. j, water Oij.

E. Directs litharge in fine powder ℥v, olive oil f℥xij, water f℥iij.

In this process, olive oil (which consists of oleine and margarine, or of oleic and margaric acids united with glycerine) is decomposed, its acids unite with oxide of lead, to form the plaster, which is a lead soap, insoluble in water, and glycerine with some uncombined oxide of lead is dissolved by the water employed in making it, which also aids the reaction, and keeps the heat moderate.

USES.—To form other plasters, it may be applied spread on calico for strapping to support ulcers according to Baynton's method of treating them, but adhesive or soap plaster is more commonly used.

Emplastrum Resinæ, D. L. *Emplastrum Resinosum*, E.
Resin or Adhesive Plaster.

Preparation.—D. Litharge plaster ℔ij, melt over a slow fire, and add castile soap in powder ℥ij, resin in powder ℥iv, and mix intimately.

L. Litharge plaster ℔iij, melt and add resin powdered ℔ss.

E. Litharge plaster ℥v, resin ℥j; melt together, and stir while cooling.

It is sold spread on calico, and much used to retain the edges of wounds together, and as a strapping for ulcers; the quantity of resin in this preparation, causes it to be considered over stimulating by some persons, Baynton's original plaster contained only ℈ij of resin to ℔j of lead plaster.

Unguentum Plumbi Compositum, L. *Compound Lead Ointment.*

Preparation.—Mix chalk ℥viij, with vinegar f℥vj, when effervescence ceases, add the solution gradually to lead plaster ℔iij, and olive oil Oj, previously melted together, and stir until cooled.

An acetate of lime is formed and mixed with the plaster and oil; it is an imitation of *Kirkland's neutral cerate* used to dress ulcers as a sedative and astringent.

STANNUM, D. E. (Sn,=58.) *Tin.*

Tin was known in the earliest ages, for the bronze instruments of ancient nations are an alloy consisting partly of this metal; England yielded it to the Phœnicians, and most of that yet employed is obtained in Cornwall, or from the East, in Malacca and Banca; it is found principally as peroxide, the wood or stone tin, and sometimes as a sulphuret, termed tin pyrites; the oxide is easily reduced to metal by heating it with charcoal, or coal, in a reverberatory furnace. Tin is white, brilliant, malleable, and very soft, having but little tenacity, and giving a peculiar crackling sound when bent, dens. 7·3; it melts at 442°; tin is very slowly oxidized by air or water, and is therefore used to cover and protect iron and copper cooking vessels; by nitric acid it is rapidly acted on, forming a peroxide, which is sold as putty powder.

Tests.—Boiled in muriatic acid, it forms a protochloride of tin which yields with caustic potash a white precipitate, soluble in excess of potash; with sulphuretted hydrogen, a brown sulphuret; and with chloride of gold, the purple powder of Cassius.

Adulterations.—Lead may be contained in tin, or lead or pewter filings mixed with it; "100 grains, finely granulated, are entirely converted into a white powder with nitric acid (dens. 1380) f℥iij; distilled water boiled with this powder and filtered, gives no precipitate with sulphate of magnesia. E." Lead would afford a white deposit.

Stanni Pulvis, D. E. *Powdered Tin.*

Preparation.—D. Melt grain tin in a black lead crucible, and while cooling, stir it with an iron rod until reduced to powder; separate the finer particles by a sieve, and when after being several times in succession shaken with distilled water, the decanted liquor appears quite clear, let it be dried and kept for use.

E. Melt tin in an iron vessel; pour it into an earthenware mortar, heated a little above the melting point of the metal; triturate briskly as the metal cools, ceasing as soon as a considerable portion is pulverized; sift the product, and repeat the process with the residue.

USES.—Tin is employed as a vermifuge; it is usually considered to be of service in removing the tape worm; others deny that it affects this parasite, and assert it is most beneficial with lumbrici. There is much doubt as to its mode of action; thus, it is stated mechanically to detach the worms from the intestine; others suppose that tin is poisonous to them, and attribute its effects either to the metal oxidizing, or to the formation of sulphuretted hydrogen; and some think that arsenic may be contained in the tin, and be the source of its utility.

DOSE.—ʒss to ʒij in electuary; so much as ℥j has been given; its exhibition should always be followed by infusion of senna or some other purgative.

ZINCUM. (Zn,=32.) *Zinc.*

Zinc is a crystalline, blueish white metal, of dens. 6·8 to 7·2; at common temperatures it is tough and hard; when heated from 212° to 300°, it becomes ductile, and is easily drawn into sheets or wire; at 400° it is very brittle, so that it may be powdered; about 773° it fuses; and at a full red heat volatilizes; its vapour burns in the air, forming clouds of white oxide. Zinc tarnishes under water or if exposed to the atmosphere, a coating of suboxide being produced, which protects it from further corrosion. The metal is obtained from the sulphuret, termed blende, and the impure carbonate or calamine, by roasting, which converts them into oxide; when this is mixed with carbon and strongly heated, it is reduced to metal, which sublimes, or passing through a tube in the bottom of a retort closed at the top, it is condensed in water, and purified by a second distillation.

IMPURITIES.—Zinc may contain iron, carbon, cadmium, and frequently arsenic; by sulphuric acid the zinc is dissolved, forming a sulphate, and hydrogen is given off, any arsenic escaping with the gas as arseniuretted hydrogen. (See Marsh's test for arsenic.) By distilling, zinc may be purified, the cadmium and arsenic coming over with the first portion, which should be rejected.

TESTS.—In solution, with sulphuretted hydrogen, it forms a white hydrated sulphuret; with alkalies, a white precipitate, soluble in excess; with alkaline carbonates, a white deposit, insoluble in excess; the carbonate of ammonia, however, gives a white precipitate, which is redissolved by it; and ferrocyanide of potassium produces a white ferrocyanide.

USES.—The metal appears inert; its oxide and carbonate are astringent, applied externally; its chloride is caustic; and its sulphate acts as a tonic and emetic.

OXYDUM ZINCI, D. L. E. (ZnO,=40.) *Oxide of Zinc.*

Formerly known as flores zinci, or lana philosophica; it is found in the red zinc ore of America, combined with sesquioxide of manganese; as prepared artificially, it forms a light white, or yellowish white, tasteless powder, without smell, and insoluble in water; when heated it becomes yellow; it fuses at a low white heat, and by increased temperature volatilizes; it is readily soluble in most acids, and in the alkalies.

Preparation.—D. Place carbonate of zinc in a clay crucible, furnished with a cover, and expose it to a very low red heat, until a portion of the contents of the crucible, taken from its centre, ceases to effervesce on being dropped into dilute sulphuric acid.

L. Dissolve sulphate of zinc ℔j, and sesquicarbonate of ammonia ℥viss, each in distilled water Oxij; strain, mix, and wash the precipitate repeatedly with water; and lastly, burn it for two hours in a strong fire.

E. Sulphate of zinc ℥xij, carbonate of ammonia ℥vj; dissolve each in distilled water Oij, and proceed as in the L. form.

On mixing carbonate of ammonia and sulphate of zinc, a mixture of carbonate and hydrated oxide of zinc precipitates, $3ZnO.HO+2ZnO,CO_2$, considered by some to be a basic carbonate; a sulphate of ammonia is obtained at the same time, and removed by washing; the carbonate of zinc is afterwards converted into oxide by the application of heat, water and carbonic acid being expelled. D. employs a carbonate already prepared; L. and E. form one in the first stage of the process; the directions given by D. regarding the heat, should be attended to, as higher temperatures may fuse the oxide.

TEST.—Dissolved in sulphuric acid, it gives the characteristic reactions of zinc.

IMPURITIES.—It should be soluble in muriatic or sulphuric acid, without effervescing; but the preparation sold under the name of oxide, is often a carbonate of zinc, obtained by precipitation, and therefore does effervesce; sometimes it is made by adding an alkali to sulphate of zinc, which causes a subsulphate to fall instead of an oxide, it dissolves in nitric acid, and gives with salt of barium a white insoluble deposit of sulphate of barytes.

USES.—It is stated to be tonic and sedative, and has been employed in epilepsy, chorea, and neuralgic affections; its exhibition should be continued for three or four weeks at a time, as its effects, if any, are very slow; Heller lately asserts he has seen it given in doses of ʒij, twice daily, and detected the entire quantity in the fæces in the same form in which it was given; it must, therefore, he concludes, have been inert. Externally, it is used as a dusting powder to excoriations, superficial ulcers, burns, eczematous and impetiginous eruptions, &c., to check excessive discharge, being considered absorbent and astringent; its comparative freedom from poisonous effects renders it much preferable to litharge for this purpose; in the proportion of ʒiij diffused in water f℥viij, with mucilage, it has been prescribed as a lotion for ophthalmia tarsi, and as an injection in gonorrhœa.

DOSE.—Gr. ij to iij gradually increased to gr. x, two or three times in the day, in powder or pill.

Unguentum Zinci Oxydi, D. *Unguentum Zinci*, L. E. *Zinc Ointment.*

Preparation.—D. Ointment of white wax ℥xij; melt, and add oxide of zinc ℥ij; mix intimately, and stir constantly until the mixture concretes.

L. Oxide of zinc ℥j, lard ℥vj; mix.

E. Oxide of zinc ℥j, simple liniment ℥vj; mix.

Used for the same purposes as oxide of zinc, whenever a mild astringent ointment is required.

Tutty, or an impure oxide of zinc, is obtained from the chimneys of zinc furnaces; when finely powdered it is used for dusting excoriations, and by some highly valued as an eye ointment, when the lids are excoriated or adhere together in ophthalmia tarsi. This *Ointment of Janin* is composed of tutty ʒij, Armenian bole ʒij, calomel ʒj, lard ℥j.

ZINCI CHLORIDUM, D. (ZnCl,=68.) *Chloride of Zinc.*

The chloride of zinc forms white, or greyish, semi-transparent masses, of soft waxy consistence; it melts a little above 212°, so that its solution, when evaporated, never becomes solid while hot; it is very deliquescent, and soluble in water and in alcohol; at a strong heat it may be sublimed, and obtained in needle-like crystals.

Preparation.—D. Take solution of chloride of zinc, evaporate it down in a porcelain capsule, so far, that upon suffering the residual liquor to cool, it solidifies; subdivide the product rapidly into fragments, and enclose them in a well stopped bottle.

It may also be got by dissolving zinc in muriatic acid, and evaporating the solution until it concretes on cooling; in this process the acid is decomposed, hydrogen escapes, and chlorine uniting with the metal forms a chloride of zinc, $\mathrm{Zn}+\mathrm{HCl}=\mathrm{ZnCl}$, and H.

TESTS.—With nitrate of silver it yields a deposit of chloride of silver, soluble in ammonia; the tests for zinc show its presence.

USES.—This salt was brought into notice by Dr. Canquoin of Paris, and others, as a powerful caustic; he used it in fine powder, mixed with two to five parts of flour, and made into paste with a little water; Soubeiran recommends two parts of chloride of zinc, one of chloride of antimony, and five of flour, which forms a soft paste, easily moulded as desired; it causes heat in the part, soon increasing to violent burning pain, lasting six to eight hours, or until it destroys the surface it is in contact with, causing a firm white slough, that is detached in ten or twelve days; its action chiefly depends on its affinity for water, which it abstracts from the tissue in deliquescing, and for albumen and gelatine, with which it forms the eschar; it acts like chloride of antimony, but corrodes more deeply, and from the severe pain it produces, a small space only should be cauterized at a time; this caustic leaves a healthy granulating ulcer, when the slough is detached, and its advocates assert that besides its destructive action, it exerts a beneficial influence over the surrounding tissue. It is employed to destroy nævi and cancerous growths, to scrofulous and chronic venereal ulcers, and to form issues; for tooth-ache, a small fragment has been placed in the hollow tooth, and covered with cotton, it rapidly melts, and often gives relief; sulphate of zinc will frequently allay tooth-ache, and is preferable to the chloride, not being a caustic. Internally, the chloride of zinc has been used for scrofula, epilepsy, and facial neuralgia; the Germans employ an *Ether Zinci*, composed of chloride of zinc ℥ss, alcohol f℥j, sulphuric ether f℥ij; dose, gtt iv to viij twice daily.

DOSE.—For internal use gr. j to ij, in solution.

Zinci Chloridi Liquor, D. *Solution of Chloride of Zinc.*

Preparation.—Place sheet zinc ℔j, in a porcelain capsule, gradually add commercial muriatic acid Oiiss, applying heat until the metal is dissolved, filter through calico, and having added to it solution of chlorinated lime f℥j, concentrate at a boiling temperature until it occupies the bulk of Oj; let the solution now cool down to the temperature of the air; place it in a bottle with prepared chalk ℥j, and having first added distilled water, so that the bulk of the whole may be Oij, shake frequently for twenty-four hours; finally filter, and keep the product in a well stopped bottle. Dens. 1593.

The muriatic acid in this process is separated into hydrogen gas, which escapes, and chlorine that unites with the zinc, $HCl, + Zn, = ZnCl$ and H. but as commercial zinc usually contains some iron as an impurity, the solution of chloride of lime is added to decompose this, and precipitate an oxide of iron, the chalk is afterwards employed to remove any free hydrochloric acid or chlorine from the liquid.

A solution of chloride of zinc has been patented by Sir W. Burnett, for preserving wood, and as a disinfecting and antiseptic fluid; it is used in many anatomical schools, injected into the circulatory system, twenty-four hours previous to employing the ordinary arterial injection; it preserves very well, combining with the animal tissues, preventing decay, and diminishing the odour by decomposing any hydrosulphuret of ammonia, though its powers of destroying contagion are very doubtful. By mistake this solution is occasionally taken internally; it acts as an irritant poison, causing pain and vomiting, with cold sweats, faintness, and convulsions, but fatal accidents with it are rarely met. The Ph. preparation is weaker than Sir W. Burnett's, the dens. of which is about 2·0, and containing twenty-five grains of zinc in f℥j; by calculation, that of D. yields between twenty-one and twenty-two grains in f℥j. In using either of them as deodorizers, they may be largely diluted with fluid, in the proportion of one part, to twenty or forty of water.

ZINCI CARBONAS. ($ZnO,CO_2=62.$) *Carbonate of Zinc.*

Calamine, L. E. is sold as a heavy pink powder, or in little masses, which if genuine, should perfectly dissolve in the mineral acids with effervescence. The native carbonate is found in earthy looking pieces, and occasionally crystallized, dens. about 4·4; the native silicate of zinc, termed electric calamine, is not used medically, it gelatinizes on the addition of muriatic acid.

IMPURITIES.—Owing to the value of zinc ore for smelting, its ore is removed, and the earthy mineral on which the zinc is found, is often powdered, coloured with oxide of iron, and sold as a calamine;

most of this substance therefore is only sulphate of barytes, mixed with carbonate of lime, and red oxide of iron, containing no zinc or merely traces of it; hence D. has rejected it from the Materia Medica, and substituted a precipitated carbonate in its stead. Anything insoluble in nitric or sulphuric acid may be regarded as impurity.

EFFECTS.—Probably similar to oxide of zinc, it is supposed to be astringent, and employed as a dusting powder to excoriations, burns, and discharging surfaces.

Calamina Præparata, L. *Prepared Calamine.*

Preparation.—Burn the calamine, then bruise it, and make it into a fine powder, as chalk is directed to be prepared.

The burning expels carbonic acid, and forms an oxide of zinc, it is therefore objectionable, although the resulting oxide is a useful substance.

Ceratum Calaminæ, L. E. *Calamine Cerate.*

Preparation.—L. Wax ℔ss, olive oil ℥xvj, melt and add calamine ℔ss when they are cooling.
E. Calamine one part, simple cerate five parts; mix well.

This ointment, called also Turner's cerate, is much used; if made with genuine calamine, it is a good astringent ointment.

Zinci Carbonas, D. *Precipitated Carbonate of Zinc.*

Preparation.—Dissolve crystals of commercial carbonate of soda ℔ij, in boiling distilled water Ovj, add to this, solution of chloride of zinc Oj, in successive portions, and boil until gas ceases to be evolved; collect the precipitate on calico, and wash it with distilled water, until the washings cease to cause turbidity in a solution of nitrate of silver containing free nitric acid; then dry the product on blotting paper placed on a porous brick, and finally by a steam or water heat.

By precipitating chloride of zinc with carbonate of soda, an interchange of elements occurs, producing carbonate of zinc which is deposited, and chloride of sodium, which is removed by washing, but some carbonic acid escapes in the process, hence, the result is a basic salt. $3ZnO,HO+2ZnO,CO_2$.

It is intended for procuring oxide of zinc, but may also be employed in preparing an ointment, which will be white instead of the reddish Turner's cerate of L. and E.

ZINCI SULPHAS, D. L. E. ($ZnO,SO_3+7Aq,=143.$)

Sulphate of Zinc.

Sulphate of zinc is found native in some localities; for commerce it is sold in white, coherent masses, like loaf sugar, known by the term white vitriol; or in transparent crystals, sometimes of large size, these are right rhombic prisms if spontaneously evaporated, and oblique rhombic prisms if procured by evaporating above 125°; they are soluble in twenty-seven parts of cold, or one part of hot water, and insoluble in alcohol; in warm air the crystals effloresce, when heated, they loose six atoms of water, and the seventh atom at a temperature of 270°, an intense heat expels the acid leaving a residue of zinc; the taste of sulphate of zinc is astringent and metallic.

Preparation.—D. Zinc, laminated or in small fragments ℥iv, commercial oil of vitriol f℥iij, distilled water Oj, place in a porcelain capsule, and when gas ceases to be developed, boil for ten minutes; filter the solution through calico, add commercial nitric acid fʒj, and evaporate to dryness. Dissolve the dry salt in distilled water Oj, and shake the solution when cold, several times for six hours in a bottle with chalk ʒij, and then clear it by passing through a filter; it is now, after being acidulated with dilute sulphuric acid fʒj, evaporated till a pellicle begins to form on its surface, and then set to crystallize, the crystals thus obtained should be dried on blotting paper without heat and kept in a bottle; by concentrating the solution from which the crystals have separated, more may be got.

L. Zinc in small pieces ℥v, dilute sulphuric acid Oij; mix gradually, when effervescence ceases, strain and boil down until a pellicle forms, lastly set aside to crystallize.

E. Prepared, either by dissolving zinc in dilute sulphuric acid till a neutral liquid be obtained, filtering the solution and concentrating until crystals form on cooling; or, repeatedly dissolve and crystallize the impure sulphate of zinc of commerce until the product, when melted in water, does not yield a black precipitate with tincture of galls, and corresponds with the characters laid down for sulphate of zinc. (See under adulterations.)

When dilute sulphuric acid acts on zinc, water is decomposed; its hydrogen escapes, the oxygen unites with the metal, forming oxide of zinc, which with sulphuric acid becomes a sulphate; Zn, and SO_3HO; $=ZnO$, SO_3 and H. But commercial zinc usually contains iron, that is also converted into a proto-sulphate, to remove the latter, D. directs a small quantity of nitric acid to be added, which forms persulphate of iron, the evaporation to dryness reduces most of this to red oxide, and the agitation with chalk completely removes it, and any excess of acid in the solution; a little more vitriol is finally mixed with the liquid which is crystallized; E. accomplishes the same object by repeated crystallizing.

In commerce this salt is extensively procured by roasting blende, the native sulphuret of zinc; an impure sulphate forms, which is fused and run into moulds, constituting the white vitriol of commerce; it is sold in crystalline masses like loaf sugar, and contains iron, and often copper, lead, &c.

Tests.—Salts of barium give a white sulphate of barytes with it; (for zinc see its reactions.)

Adulterations.—Iron and copper may be found in this salt; by adding ammonia, it precipitates the zinc and redissolves it when added in excess, any oxide of iron also is deposited, but remains undissolved with more ammonia, and copper would give a clear blue fluid. "When the solution in six waters is boiled with a little nitric acid and ammonia added, the oxide first thrown down is redissolved, no yellow precipitate remaining, and the solution is colourless, E."

Uses.—In large doses sulphate of zinc may act as an irritant poison, but its emetic powers usually cause its ejection before any harm is done; as an emetic is it employed in accidents from poison, especially with narcotics; its action is speedy and usually free from depressing nausea, hence its exhibition is indicated wherever the object is simply to evacuate the contents of the stomach. In moderate doses, it is prescribed as a tonic and astringent, in chronic forms of dysentery, diarrhœa, or catarrh, and in gleet it is asserted to be sometimes of benefit; as an antispasmodic, it has been given for nervous and convulsive affections, as hysteria and chorea, with occasional success. Externally, the sulphate of zinc is much used; as an astringent in injection for gonorrhœa, gleet, and some forms of lencorrhœa; as a collyrium for ophthalmia, in its chronic and subacute attacks; and in lotion, to ulcers with excessive discharge; such an application is especially useful in healing simple non-contagious sores, left after mercurial treatment of primary syphilitic disease. For the radical cure of hydrocele, an injection of the salt dissolved in water, is a favourite method of treating this affection, and usually employed with the best effects.

Dose.—As a tonic, from gr. j to v, may be prescribed in pill; for an emetic about ℈j in solution; in lotions for ophthalmia, about gr. j to ij dissolved in f℥j of distilled water; as an injection in gonorrhœa, &c., usually, gr. ij to f℥j; and some direct much stronger solutions for this purpose; to ulcers ʒss to ʒj may be applied in f℥j of water, but weaker lotions are often preferred; in hydrocele the injection may be composed of ʒj of sulphate of zinc, to water Oj.

ZINCI ACETAS, D. $(ZnO,C_4H_3O_3+3Aq,=118.)$
Acetate of Zinc.

This salt crystallizes in soft, pearly plates of white colour, which are rhomboids usually modified in hexagonal tables; it is odourless and of an astringent metallic taste; when boiled in alcohol it is decomposed, precipitating a basic acetate; in dry air it effloresces, and is very soluble in water. Dr. Thompson states that its crystals contain seven atoms of water, instead of three.

Preparation.—Dissolve acetate of lead ℔j, in distilled water Oiiss, nd having placed the solution in a cylindrical jar, immerse in it, sheet zinc ℥iv, rolled into a coil; after twenty-four hours, decant the liquid, and evaporate it to f℥xv, then drop into it solution of chlorinated lime until a reddish precipitate ceases to form; clear it by filtering, acidulate with a few drops of acetic acid, and evaporate down to f℥x, when upon cooling, crystals will form; these and any additional crystals obtained by concentrating the mother liquor should be dried on blotting paper placed on a porous brick, and kept in a well stoppered bottle.

In this preparation the zinc replaces lead in the acetate of lead, an acetate of zinc forming a solution, and metallic lead being deposited, often in a beautiful arborescent form; $PbO,Acet,+Zn$; $=ZnO,Acet,$ and Pb, afterwards some chlorinated lime is added, which decomposes any iron usually contained in the zinc of commerce, precipitating red oxide of iron and forming some acetate of lime which remains in the mother liquid. The acetate of zinc may also be got by mixing sulphate of zinc with acetate of lead, when double decomposition ensues, a sulphate of lead precipitating, and acetate of zinc can be crystallized by evaporating the clear solution; $PbO,Acet,$ and ZnO,SO_3 $;=PbO,SO_3,$ and $ZnO,Acet$; 143 grains of sulphate of zinc, and 190 grains of sugar of lead, yield 154 grains of crystallized acetate of zinc and 152 of sulphate of lead.

Tests.—It is recognized as an acetate by heating it with sulphuric acid, when it evolves the odour of acetic acid,

Uses.—Similar to sulphate of zinc, it however is rarely given internally; about the second or third week of gonorrhœa it forms a useful injection dissolved in water, and may also be employed as a lotion to ulcers requiring an astringent application, and in weak solutions as a collyrium in chronic opthalmia.

Dose.—Gr. j to iij gradually increased, ℈j would act as an emetic; for injections, gr. ij to vj may be melted in f℥j of rose water, or Sir A. Cooper's formula may be prescribed, of sulphate of zinc, gr. vj, mixed with dilute solution of subacetate of lead f℥iv.

CYANOGEN. (Cy, or C_2N,=26.)

Cyanogen does not exist in nature ready formed, but is easily made by bringing its component elements together, with heat and some substance to which it may unite. It may be procured by heating the cyanide of mercury, or of silver in a glass tube, when it escapes as a gas, and can be collected over mercury; it is colourless, has a peculiar pungent smell, when ignited, burns with a rose coloured flame and blueish halo, and can be condensed by pressure into a transparent liquid. It is of interest, from acting like a simple element in its combinations, although composed of carbon and hydrogen, and is contained in hydrocyanic or prussic acid.

ACIDUM HYDROCYANICUM. (HCy,=27.)

Prussic Acid.

So termed from being first obtained from prussian blue; it was discovered in 1782 by Scheele, and in 1815 Guy Lussac got the anhydrous acid, and explained its composition. Hydrocyanic acid may be procured from cherry laurel leaves, the kernels of peaches or plums, peach blossoms, and many other vegetable substances; in most, perhaps all of these, it is produced by the decomposition of an element termed amygdaline, which they contain; for medical use, it is obtained from some of the salts (cyanides) that it forms.

Anhydrous prussic acid is a colourless liquid, which boils at 80° and becomes solid at 5°; it is very volatile, and if a drop of it be suspended on a glass rod, one portion rapidly evaporating, will produce such cold as to freeze the remainder; its vapour is combustible, and when mixed with oxygen, forms an explosive compound, its dens. is ·696 at 67°; if kept, it soon decomposes, becoming reddish brown, and generating ammonia.

Acidum Hydrocyanicum Dilutum, D. L. *Acidum Hydrocyanicum,* E. *Hydrocyanic or Prussic Acid.*

Preparation.—D. Dissolve ferrocyanide of potassium ℥ij, in water, f℥viij, and dilute commercial oil of vitriol f℥j with water f℥iv, when both solutions are cold, introduce them successively into a retort or matrass containing several slips of platinum foil, and connected in the usual manner with a Liebig's condenser, and with the aid of a gentle heat, distil over f℥viij; finally dilute this with f℥viij of distilled water, or so that the volume of the diluted acid shall be f℥xvj. Its dens. is ·997.

L. Sulphuric acid ℥iss, water f℥iv, mix; when cool, place them in a glass retort, and add ferrocyanide of potassium ℥ij, dissolved in water Oss; pour f℥viij of distilled water into a cooled receiver, and the retort being fitted on, let f℥vj of acid, distilled with a gentle heat in a sand bath, pass into the water in the receiver, lastly, add f℥vj more of distilled water, or a sufficiency, so that 12·7 grains of nitrate of silver dissolved in distilled water may be accurately saturated by 100 grains of the acid.

It may also be prepared when wanted more immediately, from forty-eight grains and a half of cyanide of silver added to distilled water f℥j, and mixed with thirty-nine grains and a half of hydrochloric acid; shake all these in a stoppered phial, and after a short interval, pour off the clear liquor into another vessel; keep this for use, the access of light being prevented.

E. Dissolve ferrocyanide of potassium ℥iij in water f℥xj, place it in a matrass, and add sulphuric acid f℥vj, previously diluted with water f℥v, and cooled; connect the matrass with a proper refrigerator; distil with a gentle heat, by a sand bath or gas flame till f℥xiv pass over, or the residue begins to froth up; dilute the product with distilled water to f℥xvj.

On mixing six atoms of sulphuric acid with two atoms of ferrocyanide of potassium, they form three atoms of bisulphate of potash, three of prussic acid, and one of a new compound, Everitt's yellow salt, composed of $2,FeCy+KCy$, which absorbing oxygen, becomes green, and abandoning its KCy, finally changes into prussian blue; at first Everitt's salt is white, as stated by Pereira. In symbols, the changes which occur are as follows:—$6,SO_3HO$, and $2\ (FeCy+2KCy)=3\ (KO,SO_3+HO,SO_3)$, $3HCy$, and $2,FeCy+KCy$.

When prussic acid is made by mixing hydrochloric acid with cyanide of silver, the reaction is simple; the chlorine of the acid and the silver form chloride of silver which precipitates, hydrogen then combining with cyanogen constitutes prussic acid, $AgCy+HCl=HCy$ and $AgCl$.

Diluted prussic acid is a colourless liquid, having the smell and taste of the concentrated acid, but in a minor degree; the taste is described as pungent, by others it is considered as hot and bitter, its odour is stated to be like bitter almonds, and to cause a sense of acridity in the nose and throat, it is however decidedly different from the perfume of almonds, and Dr. Taylor states the remarkable fact, that while some persons easily perceive its odour when diluted, others only feel constriction of the fauces, or do not smell it at all. Hydrocyanic acid varies considerably in its strength, that of D. and

L. should contain about 2 per cent of real acid; of E. 3·3 per cent; and the acid usually sold as Scheele's should have about 4 per cent. The strength of any preparation is determined by adding to 100 grains of it, an excess of nitrate of silver, collecting the precipitate that falls, and weighing it when dried, five parts of this cyanide of silver are equal to one part of real acid; for this process, the fluid must be obtained free from any of the mineral acids.

ADULTERATIONS.—A little muriatic or sulphuric acid is often added to prussic acid, being found to retard its decomposition; their presence is easily detected by the following ingenious test of Dr. Geoghegan; a white salt is formed by adding cyanide of mercury to a solution of iodide of potassium, if placed in pure hydrocyanic acid, it remains unchanged, but if other acids are present, it forms the scarlet iodide of mercury. Prussic acid should be preserved in stoppered bottles, and in the dark, for light accelerates its spoiling; as sold, it is often unfit for use, from being kept too long, or having undergone destructive changes of a complicated nature.

TESTS.—Nitrate of silver causes a white precipitate with it of cyanide of silver, resembling the chloride of silver, but distinguished by its solubility in boiling nitric acid, and when dried and heated in a tube, by yielding cyanogen gas; the vapour of prussic acid will produce this reaction, which is very delicate. On adding caustic potash to hydrocyanic acid to saturate it, and then a solution of common sulphate of iron, a dirty green or brown deposit falls; when dilute sulphuric or muriatic acid is mixed with this, prussian blue is formed.

EFFECTS.—Prussic acid is prescribed with benefit in those painful affections of the stomach, termed gastralgia or gastrodynia, which follow the use of very hot food, cold liquids, or over distension of this organ after eating; it also allays pyrosis or the habitual discharge of acrid fluid, and the vomiting that is liable to occur in these cases; and has been used to check emesis depending on other causes, as pregnancy, and to relieve hiccup; it is employed as a sedative, in rheumatic, cancerous, and other affections attended with pain, but usually affords only trifling relief; for phthysis, in which it was once supposed to have some curative powers, it is seldom given, except when the diarrhœa or cough is troublesome; and it is sometimes exhibited with the intention of removing spasmodic attacks, as chorea, although it rarely succeeds. Externally applied, it eases the troublesome itching of some skin diseases, as prurigo, for this purpose it should be diluted, and its effects carefully watched.

When prussic acid is taken by accident or design, in a large dose, as f℥ss to f℥j, it acts as a rapid poison; the symptoms may commence at once, and are rarely delayed beyond one or two minutes, the person becomes insensible, his eyes glistening, the pupils dilated, the skin cold and clammy, his pulse can hardly be felt, and the breathing is slow and gasping; death usually ensues in these cases within two to ten minutes, and is occasionally preceded by convulsions. In smaller doses, hydrocyanio acid causes pain and giddiness in the head, nausea, loss of muscular power, sometimes vomiting, epileptic convulsions, frothing at the mouth, spasmodic breathing and insensibility; these effects may arise rapidly, or be deferred for some minutes, so as to permit voluntary acts, and if death does not ensue within half an hour or an hour, the sufferer usually recovers. One grain of anhydrous acid or a corresponding quantity of the dilute acid is probably a fatal dose, but as much more is taken in general, by suicides, the majority of these cases terminate fatally. There is little doubt that it becomes absorbed, as sufficient time elapses before it operates, to permit its entering the blood, in which it has been detected; its effects shew a great similarity to an attack of epilepsy, and death appears to arise from the respiration becoming obstructed, and sometimes from cessation of the action of the heart.

TREATMENT.—Cold affusion is the best remedial means, and that most easily procured, it should be applied over the spine; chlorine has been strongly advised, its utility seems doubtful, and it is difficult to obtain; when chlorine water can be got, its dose is f℥j or ij properly diluted; if the patient is able to swallow, ammonia should be applied to the nostrils, and artificial respiration ought always to be employed in these cases.

DOSE.—Two to four drops may be given three or four times daily in some mild fluid, and the dose gradually increased to eight or ten drops if necessary, but with great care; the acid is supposed to float on the top of the mixture, and thus a single dose might be taken dangerously strong; although this does not seem to be correct, it is better to prescribe it in separate draughts to avoid any errors in its employment.

ALCOHOL.

During the growth of grain, its insoluble starch gradually changes into soluble sugar fitted for the nutrition of the new plant; this appears to be caused by a slow decay occurring in the gluten of grain (a nitrogenised substance analogous to albumen in animals,) which becoming diastase, has then the power of converting its starch into sugar. The process is imitated in malting, when grain is made to sprout by gentle heat and moisture, but as the growing plant would rapidly consume all the starch and sugar, it is necessary to kill it as soon as the gluten becomes diastase, or to dry it by kiln heat, when the grain has grown sufficiently; according to the temperatures employed in this process, the malt is pale coloured, if intended to produce ale, or burned, and dark brown, when it yields porter.

When malt is mashed in water, the starch, $C_{12}H_{10}O_{10}$ dissolves out, and gradually passes into dextrine, $C_{12}H_{10}O_{10}$ which does not form a jelly, or act on iodine as starch would, and then is changed into grape sugar, $C_{12}H_{10}O_{11}+3Aq$, by fixing the elements of water; from this, the alcohol is finally got, and it is probable that although cane sugar does yield alcohol, it is always first converted into the condition of sugar of grapes.

Vinous fermentation is the change of a liquid containing sugar or some substance capable of forming it into alcohol, caused by adding a ferment such as yeast to it, at a temperature between 70° and 80°, the solution soon becomes turbid, a froth collects on its surface, and carbonic acid gas escapes abundantly, the impurities then subside, and the liquid finally becomes clear, its sugar has disappeared, and alcohol taken its place. As dried grape sugar may be stated to consist of $C_{12}H_{12}O_{12}$, the change is simply its conversion into two parts of alcohol, $2C_4H_6O_2$ and four of carbonic acid $4CO_2$; the use of yeast, in forming sugar into alcohol, being similar to that of diastase in changing starch into sugar, or what Berzelius terms *catalytic*, that is, the yeast decomposing, communicates to the particles of sugar such a degree of instability, that they split into alcohol and carbonic acid; it has also been thought by some authorities that the yeast was a plant, which by vegetating, changed the sugar into alcohol, but the former view is now the one universally prevailing. From the fermentation of various fluids yielding saccharine matter, we obtain ale, beer, wine, cider, &c.; by distillation, these weaker liquids are deprived of water, and their non-volatile parts, and according to their source constitute brandy, whiskey, rum, gin, or arrack, which differ only in strength, and in the peculiar flavouring ingredients they contain; rendered more pure and concentrated, any of them will afford rectified spirit, and when free from all water, the spiritous essence is termed alcohol.

Spiritus Rectificatus, D. L. E. *Rectified Spirit.*

Is obtained by distilling whiskey, brandy, &c. with some salt, having a powerful affinity for water, and capable of abstracting it from the spirit which then distils over in a concentrated form; for this purpose, carbonate of potash or common salt may be used. Rectified spirit should be a clear colourless fluid, of an agreeable flavour, though usually it contains a volatile oil of grain, which renders its odour somewhat unpleasant, this is detected by sulphuric acid, which gives the impure spirit a red tinge, or "by adding to f℥iv of the spirit, twenty-five minums of solution of nitrate of silver, exposing it to bright light for twenty-four hours, and then passing it through a filter purified by weak nitric acid, to separate the black powder which forms, it should then undergo no further change when again exposed to light with more of the test, E." if impure, it becomes red. The odour of corn oil is best removed by re-distilling rectified spirit with some caustic potash, or digesting it with recently burned charcoal. It contains about eighty per cent of pure alcohol; D. directs its dens. to be ·840. L. and E. state, that it is ·838.

USES.—To form various tinctures and essences. By D. it is employed in making tinctures of aconite, assafœtida, camphor, cubebs, guaiac, compound lavender, lupuline, myrrh, tolu, ginger, and the acetated tincture of iron, also for the spirits of anise, caraway, cinnamon, pulegium, pimento, and rosemary.

Spiritus Tenuior, D. L. E. *Proof Spirit.*

Preparation.—D. Mix rectified spirit Ovij, distilled water Oiv.
L. Rectified spirit Ov, distilled water Oiij; mix.
E. Rectified spirit f℥xxj, distilled water f℥xij, or a sufficiency; mix.

Its density is fixed by law at ·920 at 60°. D. and L. have directed it to be made of the same strength; of this spirit thirteen volumes weigh as much as twelve of water at 51°. By E. its dens. is ordered to be ·912, which is procured by mixing one measure of water and two of *commercial* rectified spirit. (Christison.)

Uses.—To prepare all those tinctures of D. not mentioned under the head of rectified spirit; and by the other colleges to form nearly all the alcoholic preparations which do not contain resinous matters or essential oil.

Spiritus Fortior, D. *Stronger Spirit.*

Preparation.—Carbonate of potash from pearl ash ℥viij; dry this at a low red heat, and rapidly powder it in a warm mortar; then occasionally shake it for four hours in a bottle, with rectified spirit cong. ss, keeping the temperature of the mixture about 100°; after subsiding for twenty minutes, the liquid will form two distinct strata, the uppermost of which (measuring about f℥74) should be removed by decanting or a syphon, and then distilled with the aid of a Liebig's condenser and chloride of zinc bath, until the product measures 72 ounces. Its dens. is ·818.

Uses.—To prepare essence of peppermint, spearmint, and nutmeg. D.

Alcohol, D. L. E.

Preparation.—D. Stronger spirit Oj, powdered fresh burned lime ℥x; place them in a matrass connected in the usual manner with a Liebig's condenser; apply heat until the lime begins to slake, and when the process is completed, distil by means of a chloride of zinc bath, until the liquor which comes over, together with that obtained during the shaking, measures ℥ij; this being rejected, change the receiver, and resume the distilling until nearly f℥xvj are procured. Its dens. is ·795.

L. Rectified spirit cong. j, chloride of calcium ℔j; dissolve, and distil Ovij f℥v.

E. Rectified spirit Oj, lime well burned ℥xviij, in small fragments; gently heat the lime and spirit in a glass matrass, till the lime begins to slake; withdraw the heat, and keep the upper part of the matrass cool, till the slacking is finished; then attach a proper refrigerator, and distil f℥xvij. Its dens. should not exceed ·796; if higher, the distilling must have been commenced before the slacking was finished.

Anhydrous alcohol is of dens. ·794; it boils at 168°; is very volatile and inflammable, burning with only little light; it has not been frozen, and hence is used for making thermometers to measure low temperatures; when mixed with water, alcohol evolves heat, and diminishes in volume; it dissolves the caustic alkalies, and most deliquescent salts, but precipitates the efflorescing salts from solutions.

Uses.—Only to prepare the spiritus fœniculi, D.

THEORIES.—Alcohol is considered one of a series of substances to which the term alcohols are applied, as pyroxylic spirit, oil of potato spirit, and ethal; each of these contain carbon and hydrogen, united in proportions similar to olefiant gas, along with two atoms of water, thus C_4H_4+2Aq represents alcohol, C_2H_2+2Aq is pyroxylic spirit, and $C_{10}H_{10}+2Aq$ is the composition of oil of potato spirit, or amylic alcohol; with only one atom of water the carbon and hydrogen would form an ethereal compound; and by combining them with four parts of oxygen, an acid is produced, as acetic acid from common alcohol, and valerianic acid from amylic alcohol. Ordinary alcohol may also be considered as the oxide of ethule (the base of ether) united with one atom of water, or C_4H_5O+HO.

USES.—The uses of alcohol are too numerous to be fully entered on; medically, it is employed internally, under various forms, as a stimulant, for relieving the shock consequent on serious accidents, burns, &c., and in the treatment of fevers, especially typhus, and the depression of vitality attending extensive erysipelas or gangrene, for these we administer brandy, wine, whiskey, &c. and in gin it is given as a diuretic; the question that it can be dispensed with as an ordinary article of diet has been frequently proved, as well as its expediency on moral and economic grounds, and even in the treatment of disease it is much less used now than formerly. Externally it is prescribed when diluted, for lotions, after sprains, fractures, or surgical operations; and it has been employed as an injection for hydrocele, when diluted with six to eight parts of water. Alcohol acts as a stimulant to the circulation, and probably through it on the nervous system; taken to excess, it is well known to produce drunkenness, and a larger quantity than this will cause it to act as a poison, giving rise to symptoms very similar to the vegetable narcotics, as dilated pupils, a slow pulse, stertor, coma, and sometimes convulsions, or sanguineous apoplexy; usually, when enough has been taken to prove fatal, death ensues within twelve to twenty-four hours. Alcohol has even been obtained from the brain after death, though often only its smell is detected, which is due not so much to the spirit, as to the odorous volatile oil, with which it is contaminated, and which may be present when no alcohol is found.

DOSE.—No directions or rule can be laid down on the point, for many diseases require more free use of stimulants at one time, or in one person, than for another patient, or a different epidemic constitution; in their employment, the object should rather be the minimum quantity that is necessary, than the maximum that can be borne; and when employed for collapse after injuries, it should be remembered that naturally this is followed by a state of reaction which would only be aggravated by the injudicious use of stimuli in the previous stage of depression.

ANTIDOTES.—In poisoning with alcoholic fluids, the treatment should be the removal of the contents of the stomach, by the stomach pump; the application of warmth to the extremities; and cold affusion is often of great use in arousing the patient, but its prolonged employment is liable to decrease the vital heat so much that it should not be persevered in too long, when the stupor is profound, without applying heat alternately with it; if apoplexy ensues, local depletion is of use, with the general treatment for ordinary apoplectic attacks. In drunkenness, the acetated water of ammonia has been recommended to relieve the coma.

TINCTURÆ. *Tinctures.*

They are prepared by dissolving substances in spirit, as tincture of iodine, camphor, &c., or more usually by digesting the solid ingredients in small fragments or coarse powder, with proof or rectified spirit in glass vessels for about fourteen days, D. L. (seven days, E.), then expressing the residue strongly and filtering it. Many tinctures are well made with the process of percolation used by E., and in skilful hands it yields the best results; apparatus are sold for this purpose, but a simple tube answers the object, when fitted by means of a cork, into a wide necked bottle, leaving an aperture to allow the escape of air; the lower end of the tube is closed by a piece of calico tied over it, and the materials, in a coarse or moderately fine powder, are moistened with their solvent into a pulp, and at once, or after an interval, packed into the cylinder; some more of the solvent is then poured on them, and replaced until enough passes through to measure the entire quantity required.

SPIRITUS VINI GALLICI, L. *Brandy.*

The spirit procured by distilling wine; it contains water, alcohol, a little acetic acid, and ether, colouring matter, tannin and enanthic ether, which is the chief source of its flavour; its strength is usually the same as proof spirit. The medical uses of brandy are similar to the alcoholic liquids generally; it is, however, preferred to other spirits to check vomiting, for which it is used diluted and cold, in small, repeated doses, and ice is often added to it to lower its temperature still further.

Mistura Spiritus Vini Gallici, L. *Brandy Mixture.*

Preparation.—Brandy f℥iv, cinnamon water f℥iv, the yolks of two eggs, purified sugar ℥ss, oil of cinnamon min ij; mix.

A useful form for exhibiting brandy medically. *Dose.*—f℥ss to f℥ij.

CEREVISIÆ FERMENTUM, D. L. *Yeast.*

Is the product of the decomposition of gluten in fermentation of malt liquids; it is a light greyish yellow, soft substance, readily putrefying if kept moist, though if dried it can be kept for some time ; under the microscope it is found to consist of cells containing globules, and is considered by many to be a cryptogamic plant. Used internally, in typhus fevers, it is said to be a stimulant in doses of ℥j, taken every three hours, in some fluid ; it is also employed to form the—

Cataplasma Fermenti, L. *Yeast Poultice.*

Preparation.—Yeast Oss, wheaten flour ℔j, mix and apply a gentle heat until they begin to rise.

This is a mode of employing carbonic acid in poultice ; it is used to sloughing and irritable sores as a stimulating application.

ETHER SULPHURICUS, D. L. E. *Sulphuric Ether.*

Ether is a colourless, very volatile liquid, of peculiar, rather fragrant odour, and pungent taste ; while evaporating, it causes considerable cold ; its dens. when pure is ·613 ; as usually sold, it contains some alcohol, and its dens. is therefore greater, varying from ·733 to ·765 ; it boils at 96° ; its vapour is inflammable and very dense, being of specific gravity 2·58 ; at 47° ether is stated to freeze into a white mass, but Pereira denies that this is the fact ; when freshly made, it reacts neutral ; by keeping, it absorbs oxygen, and then becomes acid ; one part of ether is soluble in nine parts of water ; it dissolves freely in alcohol ; and is also capable of holding in solution the volatile oils, most resins, bromine, and iodine, and of removing corrosive sublimate from any fluids with which it is mixed.

Preparation.—D. Mix commercial oil of vitriol f℥viij, rectified spirit f℥x, in a glass matrass capable of holding at least Oij, and without allowing the mixture to cool, connect the matrass with a Liebig's condenser, and applying sufficient heat to keep the liquid in brisk ebullition, commence the distillation. As it proceeds, admit gradually through a glass tube traversing the cork of the matrass, rectified spirit Oiiss, regulating its influx, so that the boiling liquid shall maintain a constant level ; and when the entire of it has been introduced, continue applying the heat until the contents of the matrass become black, and shew a tendency to froth over. (The tube by which the spirit enters should dip by its lower extremity, where its diameter is contracted, at least half an inch below the surface of the liquid in the matrass, and the eduction pipe of the reservoir for the spirit, with which the exterior extremity of the glass tube is connected, should be furnished with a stop cock, to regulate the descent of the spirit ;

this reservoir should be placed at least three feet above the level of the boiling liquid.) The crude ether thus got, is to be shaken with fresh burned, powdered lime ℥j, and then rectified, continuing to distil as long as the product when well shaken has a specific gravity lower than ·750; keep the ether in a cool place in stoppered bottles.

A fresh reservoir being attached to the further end of the condenser, and the distillation resumed, a product will be got which may be substituted for rectified spirit in a subsequent ether process.

L. Pour rectified spirit ℔ij, into a glass retort, add sulphuric acid ℔ij, place it on a sand bath, and raise the heat, so that the liquid may quickly boil, and the ether pass into a receiver which is kept cool with ice or water; let the liquid distil till some heavier portion begins to pass over; to the residue in the retort when the heat has subsided, add rectified spirit ℔j, and distil ether as before; mix the distilled liquors, pour off the supernatant portion, add to it carbonate of potash ℥j previously ignited, and shake frequently for an hour, lastly let the ether distil from a large retort, and keep it in a stoppered bottle. Dens. ·750.

E. Take rectified spirit f℥50, sulphuric acid f℥x, pour f℥xij of the spirit gently over the acid in an open vessel, stir briskly and thoroughly, and at once place the mixture in a glass matrass with a refrigerator attached, and heat to about 280°; when the ether begins to distil, add fresh spirit through a tube, into the matrass, in a continual stream in quantity equal to the fluid distilling over, (this is best done by connecting one end of the tube with a graduated vessel containing the spirit and passing the other end through a cork fitted in the matrass, and having a stop cock on the tube to regulate the discharge,) when f℥xlij have distilled over, and all the spirit has been added, the process may be stopped. Agitate the impure ether with a saturated solution of muriate of lime f℥xvj, containing also ℥ss of lime recently slacked; when all odour of sulphurous acid is thus removed, pour off the supernatant liquid, and distil it with a gentle heat as long as what passes over has a dens. not higher than ·735, More ether of equal strength may be obtained from the muriate of lime, and from the residue of each distillation, a weaker ether may be got in small quantity, which requires to be re-distilled.

THEORIES.—Alcohol contains $C_4H_6O_2$, by removing an atom of water, it becomes C_4H_5O, the composition of ether; however it is not mere water that is removed, it is oxygen and hydrogen from its integral structure, hence the reaction is more complex. On mixing sulphuric acid and alcohol, a compound forms, which reacting acid, and producing salts with bases, has been termed sulpho-vinic acid, $C_4H_5O,2SO_3+HO$; by heat, this undergoes decomposition, yielding at temperatures between 260° and 310°, ether, water, and sulphuric acid; a lower degree of heat resolves it only into alcohol again, and vitriol; while greater elevation of the heat forms acetic, carbonic, and sulphurous acids, olefiant gas, and oil of wine, leaving a coally residue in the retort.

Ether may also be regarded as the oxide of a hypothetic base, termed ethule, C_4H_5; it will then be written C_4H_5+O or AeO. and sulpho-vinic acid will be the bisulphate of this oxide of ethule, $AeO.2SO_3+HO$.

ADULTERATIONS.—Spirit of wine, or small quantities of water; these increase its density, which is directed to be ·750 by D. and L. and ·735, or under, by E. "When agitated with half its volume of concentrated solution of muriate of lime, in a minim measure, its volume is not lessened. E." If any diminution occurs, the presence of these impurities may be suspected.

USES.—Its effects are similar to alcohol, but much more rapid and transient; it is employed as a diffusible stimulant to allay spasm, flatulent colic, the pain attending the passage of gall stones, nervous affections as head-ache, faintness, &c., and during attacks of spasmodic asthma; in the latter stages of fever, ether is prescribed to relieve subsultus and hiccup, and in addition to wine and ammonia, when additional stimulation is requisite. The inhalation of ether is used to diminish the irritation caused by inspiring chlorine gas, and it was long known to relieve asthmatic dyspnœa when employed in a similar manner; about three years ago, the discovery was announced in America, that by respiring it for somewhat longer time, it caused insensibility, so that surgical operations could be performed under its influence, without the patient feeling them; in this city, it was first employed at the Richmond hospital, by Mr. Macdonnell, and afterwards extensively used both there and elsewhere with the greatest success; some fatal instances were, however, reported as occurring in England, and on the introduction of chloroform, ether rapidly fell into disuse as an anæsthetic agent; yet, in its medical employment, this effect must be taken into account, and some of its powers as an antispasmodic may be fairly attributed to its influence over the nerves of sensation. Externally applied, it causes considerable cold if allowed to evaporate, hence it is used in lotions for head-ache, brain affections, sprains, &c. If its evaporation is unchecked, it acts as a powerful local irritant, and is thus employed in rheumatic and neuralgic pains, &c. In pharmacy, ether is used as the menstruum for forming some tinctures, as lobelia, and to extract cantharidin, the active principle of blistering flies.

TREATMENT.—In poisoning with ether, the same means should be used as for alcohol; in particular, artificial respiration should be employed.

DOSE.—Usually f℥ss to fʒj, in some aromatic water; two grains of spermaceti rubbed with fʒj, will perfectly incorporate it with water, (United States' Dispensatory.) For asthma, a few drops of ether on sugar are placed in the mouth, and its vapour inspired. As an anæsthetic, its vapour may be breathed by placing it on a handkerchief.

Spiritus Etheris Sulphurici, E. *Spirit of Sulphuric Ether.*

Preparation.—Sulphuric ether Oj, rectified spirit Oij, mix.

The addition of spirit renders the ether miscible with water; the dens. of the mixture should be ·809; it does not affect litmus paper, or render water muddy; "when agitated with two volumes of concentrated solution of muriate of lime, twenty-eight per cent of ether separates by rest, E." Its uses are similar to ether.

Dose.—fʒj to iij mixed in sufficient fluid.

Spiritus Æthereus Oleosus, D. *Spiritus Ætheris Sulph*: *Compositus*, L. *Compound Spirit of Sulphuric Ether.*

Preparation.—D. Commercial oil of vitriol Oiss, rectified spirit Oj, mix in a glass matrass, and connecting it with a Liebig's condenser, apply heat, and distil until a black froth begins to rise; separate the uppermost or lighter strata of the distilled liquid, and having exposed it in a capsule for twenty-four hours to the atmosphere, let the residual oil be transferred to a moist paper filter, and washed with a little cold water, so as to remove any adhering acid; let it now be introduced into a bottle containing rectified spirit Oss, and sulphuric ether f℥v, and dissolved.

L. Sulphuric ether f℥viij, rectified spirit f℥xvj, etherial oil fʒiij, mix.

This preparation is known as Hoffman's anodyne, and used as a substitute of opium in some instances where that drug is objectionable, or it is combined with it, being thought to counteract the nausea that opium may cause. In forming the spirit, D. procures etherial oil as the first step of the process; L. uses it as already obtained by a distinct distillation.

Dose.—fʒss to fʒij in sufficient fluid.

Oleum Æthereum, L. *Etherial Oil.*

Preparation.—Take rectified spirit ℔j, sulphuric acid ℔iv, mix cautiously, and let the liquor distil until a black froth rises, then at once remove the retort from the fire; separate the lighter supernatant liquid from the heavier one, and expose the former for a day to the air; add to it solution of potash f℥j, mixed with distilled water f℥j, and shake them together, lastly, when sufficiently washed, separate the etherial oil which subsides.

It is an oily liquid, neutral to test paper, usually pale yellow, aromatic and pungent, of dens. 1·13, and insoluble in water; if boiled with water, it decomposes into sulphuric acid, and etherol, C_4H_4 or light oil of wine. In preparing the oil of wine, the product is usually small and uncertain in quantity; theoretically it has been considered a double sulphate of ether and etherol. $C_4H_4,SO_3+C_4H_5O,SO_3$ by Liebig; and by Dumas, as a true sulphatic ether, holding dissolved variable quantities of carbohydrogen.

USED.—To prepare Hoffman's anodyne.

Æther Nitrosus, E. *Hyponitrous Ether.*

Preparation.—Take rectified spirit Oij ℥vj, pure nitric acid (dens. 1.5), f℥vij. Put f℥xv of the spirit with a little clean sand into an Oij matrass, fitted with a cork through which passes a safety tube, terminating an inch above the spirit, and another tube leading to a refrigerator; the safety tube being filled with pure nitric acid, add through it gradually f℥iijss of the acid, when the ebullition which slowly arises is near over, gradually add the rest of the acid f℥ss at a time, waiting till the ebullition caused by each portion is near over, and cooling the refrigerator with a stream of water, iced in summer. The ether thus distilled over is received in a bottle, agitated with a little milk of lime, till it ceases to redden litmus paper, and then with half its volume of concentrated solution of muriate of lime. The pure ether should have a dens. of ·892.

Liebig gives the following directions to prepare it. Place starch one part, nitric acid of dens. 1·3 ten parts, in a large retort, connect it by a wide tube with a two-necked bottle, let the tube open into a mixture of two parts of alcohol (of eighty-five per cent), and one part of water contained in the bottle, from the second aperture of which a long tube arises, connected with a good refrigerator; on heating the retort, hyponitrous acid fumes are disengaged, pass into the alcohol, and combine with it to form the ether which distils over in a continuous stream; the alcohol in the bottle should be kept cool, or the product will be impure.

In this process, the hyponitrous fumes produced by starch and nitric acid, pass into the alcohol, set ether free, and unite with it generating hyponitrous ether. When made by acting on alcohol directly with nitric acid, as in E., the reactions are liable to be variable and complex, the nitric acid yields oxygen, which with some of the spirit, forms aldehyd and acetic acid, and the nitric now reduced to hyponitrous acid, acts on the rest of the alcohol, forming ether, and combining with it.

When pure, it is a pale yellow, inflammable fluid, smelling fragrantly of apples, of dens. ·94; boiling at 61°, and soluble in 48 parts of water, or in all proportions with alcohol or ether; when prepared by ordinary processes it is impure, boiling at 70°, and becoming brown when mixed with an alcoholic solution of potash, from the presence of aldehyd. It is used to prepare sweet spirits of nitre. E.

SPIRITUS ÆTHEREUS NITROSUS, D.

SPIRITUS ÆTHERIS NITRICI, L. E.

Spirit of Nitric Ether.

Sweet spirits of nitre is a colourless, fragrant fluid; its taste should be pungent, aromatic, sweetish, and slighly acidulous; it is inflammable and volatile, causing much cold while evaporating, and dissolves in alcohol or water; the D. preparation contains nitrous ether four parts, with forty-two of spirit (about one to ten); that of E. is much stronger, of a pale straw colour, and contains one part to four of spirit.

Preparation.—D. Place rectified spirit f℥vj, in a glass matrass, capable of holding Oij, and connect them with a Liebig's condenser, whose further extremity is fitted loosely with a collar of tow into a thin ℥viij phial; add now, water f℥j, to pure nitric acid f℥iij, and having introduced half of the resulting solution into the matrass, through a safety syphon tube, close the mouth of this tube with a cork, and apply for a few moments a gentle heat, so as to cause the commencement of ebullition; when the *action* (which soon after commencing, proceeds with much violence, and should be moderated by the external application of cold water) has relaxed, introduce gradually the rest of the acid, so as to restore it; the action having entirely ceased, shake the distilled product with half its bulk of solution of ammonia, let the mixture rest for a few minutes, and having separated the supernatant etherial liquid, mix ℥iv of it with rectified spirit Oij, and keep the product in small, strong, well closed bottles.

In the preceding distillation the condenser should be fed with ice cold water, and the phial in which the distilled liquid is received, should be surrounded by a mixture of one part salt and two of ice, or if ice cannot be got, with a mixture of eight parts of sulphate of soda in small crystals, and five of commercial muriatic acid.

E. Mix the purer hyponitrous ether, got as described, with the rest (f℥xxj) of the spirit, or four times its volume. Its density by this process is ·847; it should not be kept long, as it rapidly decomposes, becoming strongly acid.

L. Rectified spirit ℔iij, add gradually nitric acid f℥iv, and mix; then distil f℥xxxij; the dens. of this is not above ·834.

The object of these preparations is to form a mixture of nitrous ether with spirit of wine; D. and E. obtain the ether as the first part of the process, and then add the spirit; L. mixes all the rectified spirit with the acid, and distils the mixture over.

ADULTERATIONS.—Water and spirits of wine are often largely added to it to diminish its commercial value, and permit a cheap but almost worthless liquid to be sold; and by keeping, it is liable, even when pure, to become strongly acid; its density should therefore be observed, ·847, E, ·834, L. "It should effervesce feebly or not at all with bicarbonate of potash, and when agitated with twice its volume of a concentrated solution of muriate of lime, twelve per cent of ether slowly separates, E." This latter test is inapplicable to D. and L.

USES.—Its effects in large doses appear similar to those caused by sulphuric ether; when inhaled for a long time, its vapour has at least in one instance proved fatal. Taken internally in moderate doses, it promotes the secretion of the kidneys, hence it is used for dropsies, usually combined with other diuretics, as squill, digitalis, nitre, &c. Christison considers it of most utility in dropsical swellings connected with diseased heart, and least so when the kidneys are affected; along with diaphoretics, it is prescribed to cause sweating in febrile affections, and occasionally as a carminative in flatulence and colic, and as an addition to stimulating expectorants.

DOSE.—As a diaphoretic, ʒss to ʒij; as a diuretic, from ʒj to iij properly diluted.

ACETIC ACID. $(C_4H_3O_3+HO,=60.)$

This acid is procured from fermenting saccharine matter or some substance capable of forming sugar, which is converted into alcohol, $C_4H_6O_2$, and finally into acetic acid, $C_4H_3O_3+HO$, by the substitution of two atoms of oxyen for two of hydrogen in the alcohol; acetic acid always contains an atom of basic water which is replaced by metallic oxides when it forms salts, (the acetates,) anhydrous acetic acid being unknown in an isolated state. Another source of the acid is the distillation of wood, when obtained in this manner it is known as pyroligneous acid. It is used in medicine and pharmacy, in the various forms of distilled, and French vinegar, glacial acetic acid, &c.

Acetum Gallicum, D. E. *French Vinegar.*

This is got from wine by exposing it to the action of the air until changed into vinegar, a little old vinegar must be first added to the wine to enable the process to commence, and it requires attention to temperature, and peculiar manipulation to obtain a favourable result. It is usually of deeper colour, and more fragrant than malt vinegar. "Its dens. varies from 1014 to 1022, ammonia added in excess causes a purplish muddiness, and slowly a precipitate with it; in f℥iv, complete precipitation occurs with min xxx of solution of nitrate of silver. E." Mr. Phillips, however, asserts that this is twice too much.

Acetum Britannicum, E. *Acetum,* L. *British Vinegar.*

Is procured by mashing malt in water and fermenting it, as in making beer, the liquid is then placed in barrels with one end open and covered by a cloth, in dark rooms artificially heated; after a considerable time it becomes sour, and is next removed to large vessels having false bottoms, on which are laid raisins and the refuse of making English wine; it is agitated every day by drawing off a portion and transferring it to another vessel, until it is perfectly changed into vinegar.

The acid taste and odour of vinegar are well known, it is yellowish red, and less aromatic when obtained from malt, than wine vinegar; the strongest acid sold is considered to contain five per cent of real acetic acid, it usually has about 4·6 per cent, and f℥j saturates about fifty-eight grains of carbonate of soda, "sixty grains," L.; its density is stated by E. to vary from 1006 to 1012; it is in general higher, but the specific gravity is no evidence of real strength, as it is affected by the mucilaginous and other impurities which may be present. Vinegar easily decomposes from the growth of vegetable mould in it, becoming turbid and loosing its activity.

ADULTERATIONS.—Vinegar makers are legally allowed to add one thousandth part by weight, of sulphuric acid; a salt of barytes detects this, causing a white precipitate insoluble in nitric acid; "in f℥j, the precipitate should not weigh more than 1·14 grains, L." Any metallic contamination, as copper or lead, can be detected by sulphuretted hydrogen; and acrid vegetable substances as capsicum, which may be added, are perceived by the taste after saturating vinegar with carbonate of soda.

Acetum Destillatum, L. E. *Distilled Vinegar.*

Preparation.—L. Take vinegar, cong. j, distil by a sand bath, from a glass retort to a glass receiver, and keep the first Ovij for use. It contains 46 per cent of real acid; and 100 grains of it should saturate gr. xiij of crystallized carbonate of soda.

E. Take vinegar, French by preference, eight parts, distil with a gentle heat, six parts; if necessary, dilute this with water to dens. 1005. It contains 3·07 per cent of the acid, and 100 grains saturate eight grains of carbonate of soda.

Distilling separates most of the colouring, and usually the sulphuric acid; in practice a mixture of pyroligneous acid and water is often employed instead of it, hence, the following preparation is directed by D.

Acidum Aceticum Dilutum, D. *Dilute Acetic Acid.*

Preparation.—Take acetic acid of commerce, (pyroligneous acid,) dens. 1044, Oj, distilled water Ovij, mix. Its dens. is 1006.

Its uses are similar to distilled vinegar, for which it is a good substitute, and by D. it is employed to prepare the acetated water of ammonia, and the acetum opii.

Acidum Aceticum Forte, D. *Stronger Acetic Acid.*

Preparation.—Glacial acetic acid f℥vj, distilled water f℥iv, mix. The dens. of this acid is 1066.

Used by D. in the acetum cantharidis, and the acidum aceticum camphoratum; it seems rather unnecessary to have a distinct form of acetic acid for these purposes, as they might easily be so contrived as to dispense with it.

Acidum Aceticum Glaciale, D. *Acidum Aceticum,* L. E. *Glacial Acetic Acid.*

Preparation.—D. Take acetate of lead, place it in an oven at a heat of about 300°, until it ceases to loose weight, and having then rubbed it to fine powder, put it into a flask or retort, and expose it to an atmosphere of dry muriatic acid gas, until very nearly the whole of it has a damped appearance; the flask or retort being now connected with a Liebig's condenser, apply heat by means of a chloride of zinc bath until the entire of the acetic acid has distilled over.

The muriatic acid should be slowly disengaged from the materials directed in the formula for *acidum muriaticum,* using ℥viij of salt, for every ℔j of anhydrous acetate of lead; and to render it quite dry, it should before entering the vessel with the sugar of lead, be made to bubble through oil of vitriol, and then pass through a long tube packed with fragments of fused chloride of calcium. The dens. of this acid is 1065.

L. Acetate of soda ℔ij, place in a glass retort, and add sulphuric acid f℥ix, mixed with distilled water f℥ix, let the acid distil in a sand bath, taking care that the heat towards the end be not too much increased. Dens. 1048.

E. Heat acetate of lead gradually in a porcelain basin, with a bath of oil or fusible metal (composed of eight parts tin, four of lead, and three of bismuth,) to 320°, and stir till the fused mass concretes again, powder this when cold, and heat again to 320°, with frequent stirring till the particles cease to accrete; add ℥vj of the powder to f℥ixss of pure sulphuric acid in a glass matrass, attach a proper tube and refrigerator, and distil at a heat of 320° from a fusible metal bath, to dryness. Agitate the distilled liquid with gr. j or ij of red lead to remove any sulphurous acid; let the vessel rest for a few minutes, pour off the clear liquid and re-distil it. Its dens. should not be above 1065.

In all these processes, acetate of lead is employed to yield acetic acid; by D. the vapour of chlorine is used, which forms a chloride of lead, and the acid is separated by the heat of the distillation; in the forms of L. and E., sulphuric acid is added, the result being sulphate of lead remaining in the retort, and acetic acid, which is condensed in the receiver, $PbO,Acet+SO_3HO=PbO,SO_3$ and $Acet+HO$.

This acid is termed glacial acetic acid, from forming crystals when it is cooled down to 45°, they are brilliant, white plates, and do not melt until the temperature rises to 60°; when in the liquid state it is colourless, highly pungent and volatile, with an agreeable odour, and reacts strongly acid; the preparation of L. is weak, it contains 30·8 per cent of real acid, or one equivalent of anhydrous acid, and 13 of water; 100 grains of it, therefore, neutralise 87 grains of carbonate of soda; the acetic acid of D. and E. is much more concentrated, being composed of one equivalent of water and one of acid; 97 grains of it neutralising nearly 242 grains of crystallized carbonate of soda.

TESTS.—The odour of acetic acid is characteristic of it; in solution, the acetates give white crystalline precipitates with nitrate of silver and subsalts of mercury, sparingly soluble in cold water.

THEORY.—Alcohol which is composed of $C_4H_6O_2$, is converted into a fluid termed aldehyd, $C_4H_4O_2$, by loosing two atoms of hydrogen, which combine with oxygen derived from the atmosphere to form water; the aldehyd afterwards absorbs more oxygen, and finally changes into hydrated acetic acid, $C_4H_4O_4$ or $C_4H_3O_3+HO=60$.

USES.—*Glacial acetic acid* is employed in preparing aromatic vinegar; when applied locally it is a powerful rubefacient and vesicatory, with this intention it is used in the acetum cantharidis, as a cautery to warts, and in some obstinate eruptions of the scalp; in a more dilute form it is a good lotion for partial baldness or alopecia. If taken internally, it would act as a violent corrosive poison, producing symptoms similar to the mineral acids, and requiring the same treatment.

Vinegar is employed in pharmacy to prepare oxymel, the acetated tinctures of opium, squill, and colchicum, and to dissolve acetate of morphia and the acetate of lead, &c. Internally, when diluted with water, it is given as an acid drink in fevers, in hemorrhages, and to check excessive sweating, yet it is certain that a draught of vinegar causes diaphoresis. For relaxed sore throat, and in scarlatina, it is often added to astringent or stimulating gargles. In enemas it is employed to arrest hemorrhages from the rectum, or to expel ascarides. Locally, it is used in bleeding from the nose, ulcers, hœmorrhoids, &c., as an astringent; and in uterine hemorrhages, vinegar and water is frequently applied to the abdomen and vulva; much of the benefit it causes is due to its coldness, and the shock that its sudden application produces. In lotions, it is employed to recent sprains, and to the head in the delirium of brain diseases, or of fevers; for this purpose it should be sufficiently diluted, and laid on the part through the medium of very thin cloths, which aid evaporation; for heavy pieces of linen, when soaked in a lotion, by keeping in the heat, are both uncomfortable, and a positive source of mischief to the patient. Sponging the body with vinegar and water in scarlatina, is a well known means of allaying the excessive heat of skin in this disease; strong vinegar, rubbed over the chest, acts as a mild local irritant, and is useful in chronic bronchitic attacks, or in threatened phthysis. It has been long thought that acetic acid possessed disinfecting powers, though there is no evidence of its having any influence over contagion; and drinking vinegar is considered popularly to be a means of causing thinness and paleness, its use for this purpose is not free from danger, as by interfering with digestion it may lead to decline.

Oxymel, D. L. *Syrupus Aceti*, E. *Oxymel.*

Preparation.—D. Clarified honey, by weight ℔j, heat and mix commercial acetic acid, (dens. 1044) f℥iij.

L. Clarified honey Ox, heat and add acetic acid Oiss.

E. Vinegar, French, by preference, f℥xj, pure sugar ℥xiv, boil them together.

Dose.—f℥ss to f℥j added to gargles and expectorant mixtures.

Acidum Aceticum Aromaticum, E. *Aromatic Acetic Acid.*

Preparation.—Rosemary, origanum, of each dried ℥j, lavender dried ℥ss, cloves bruised ʒss, acetic acid Oiss; macerate for seven days, express strongly, and filter the liquid.

This is meant as an imitation of Henry's aromatic vinegar; it may be more easily made by dissolving camphor, with the oils of clove, lavender, and bergamot, in acetic acid; its only use is as a perfume.

Acidum Aceticum Camphoratum, D. E. *Camphorated Acetic Acid.*

Preparation.—D. Camphor ℥j, with rectified spirit fʒj, reduce it to powder, and dissolve in strong acetic acid f℥x.

E. Camphor ℥ss, powder with a little alcohol, and add acetic acid f℥viss.

Used as a pungent perfume.

ACETUM PYROLIGNEUM, D. E. *Pyroligneous Acid.*

This acid, termed *Acetum aceticum e ligno venale*, by D., is got by the destructive distillation of hard woods, as oak, ash, and birch, in iron vessels; the wood is well dried, cut into pieces, and packed in the still; when heat is applied, its elements form fresh compounds; gasses, as carbonic oxide, carbonic acid, and olefiant gas escape; acetic acid, pyroxylic spirit, water, and tar, pass over and are collected in receivers, and charcoal remains in the retort. The acetic acid, termed pyroligneous, from its source, is then mixed with lime, which separates it from several impurities, and the resulting pyrolignite of lime, evaporated to dryness; when this is distilled with sulphuric acid, it yields an impure, but strong vinegar, used in some manufactures.

For medical use, the pyrolignite of lime is mixed with sulphate of soda, an insoluble sulphate of lime results, and a soluble acetate of soda; the latter is purified by repeated crystallizings, until it becomes fit to form pure acetic acid, when it is distilled with oil of vitriol.

ADULTERATIONS.—It frequently contains some tarry matters, and empyreumatic oil; the odour of the acid will shew their presence, or its taste, when neutralized with an alkali. This impure acid should not be employed in medicine. D. directs the dens. of pyroligneous acid to be 1044.

USES.—To form vinegar when diluted with water, and to procure several preparations in pharmacy, for which its cheapness has led to its almost universal adoption instead of wine or malt vinegar, both of which are becoming comparatively rare in commerce, the liquids sold under these names, often being only dilute pyroligneous acid, with the addition of flavoring materials, as acetic ether.

D. has now officially sanctioned its use.

SPIRITUS PYROXILICUS, D. ($C_2H_3O+HO.$)
Pyroxilic Spirit.

Wood spirit or wood naphtha, is obtained by the same process that yields crude pyroligneous acid, forming about one hundredth part of the fluid as it passes from the retort; it is separated by distilling the entire product, and separating the first portions that are condensed, adding slacked lime to the acid liquid which is procured to neutralise its acids, and then removing the naphtha from the oily matters which also come over; by re-distillation, it can be got quite pure, in the same manner that spirit of wine is rectified.

When pure, it is a colourless liquid, of dens. ·798 (D. directs a weaker spirit of dens. ·846), its odour is aromatic and peculiar, it is miscible with water, and dissolves resins and volatile oils like alcohol; when burned, its flame is pale coloured, and without smoke; from its close resemblance to alcohol, it is termed methylic alcohol, or according to Liebig, the hydrated oxide of methyle MeO,HO just as wine alcohol is the hydrated oxide of ethyle.

USES.—It is recommended by Dr. Hastings in pulmonary consumption, and he considered its effects depended on some solvent power over the tuberculous deposits; although it cannot be regarded as a remedy for this affection, it is found of service in allaying the cough and vomiting which are often very distressing, and in restoring the patient to a state of comparative ease in many instances.

DOSE.—Gtt v to xx three or four times in the day, with some aromatic water.

CHLOROFORMUM, D. (C_2HCl_3=121.) *Chloroform.*

Chloroform was discovered by Soubeiran, in 1831, and by Liebig, in 1832; its composition was made known by Dumas in 1835, and its medical effects as an anæsthetic agent, first recognized by Dr. Simpson of Edinburgh, in 1847. It is a pellucid liquid, of fragrant fruity odour, and sweetish taste, its dens. is usually stated to be 1480, by D. it is directed to be 1496; it boils at 141°, and readily evaporates at ordinary temperatures, forming a very dense vapour, its specific gravity being 4116. Chloroform is nearly insoluble in water, and burns with difficulty with a greenish flame.

The theoretical relations of this body are of interest, pyroxilic spirit or wood naphtha which has been described, is considered an alcohol, and similar to the vinegar from wine alcohol, an acid can be obtained from it, which is denominated formic acid, as it exists in abundance in the bodies of ants, its composition is C_2HO_3+HO and as acetic acid is considered to contain a base, acetyl, this formic acid has a radicle, formyl, or C_2H; hence it may be written FoO_3+HO; under the influence of chemical reactions, the oxygen of formic acid can be displaced, and chlorine substituted in the compound, the result being chloroform C_2HCl_3, or as it may also be denominated $FoCl_3$, chloride of formyl.

Preparation.—Fresh burned lime ℔v, slake with boiling water Oij, place it with chlorinated lime ℔x, in a sheet iron or copper still, and pour on it water, cong. iij Ovj mixed with rectified spirit fʒxxv, and heated to 100°; connect now the still with a condenser, and apply heat, which must, however, be withdrawn the moment the distillation commences; the distilled product, the bulk of which need not exceed Oij will occur in two distinct strata, the lower of which is crude chloroform; let this be agitated twice in succession with an equal volume of distilled water, and then in a separate bottle with half its volume of pure sulphuric acid; lastly, let it be shaken in a matrass with peroxide of manganese, and rectified from off this at a very gentle heat.

By the action of chlorine upon alcohol, an oily liquid termed chloral is obtained containing $C_4HCl_3O_2$, which is at once changed when in contact with an alkaline substance, as lime, into formic acid and chloroform; the latter distils over, mixed with an upper stratum of water, spirit, and impurities from which it is separated by agitation with more water, and then with sulphuric acid; the black oxide of manganese being finally used to remove any of this acid, and the product re-distilled. The lighter liquid which distils over with the chloroform, and the water used in washing the latter, should be preserved with the view of their being introduced with a new charge into the still in a subsequent process.

ADULTERATIONS.—Chloroform may be made from ether, alcohol, or wood spirit; the latter as met in commerce, being a mixture of several liquids, all of which do not yield chloroform, the product thus obtained is impure, and its amount is liable to vary, but the quantity is always less than from alcohol. The impurities have been examined by Miahle and Soubeiran, they are oily substances, containing chlorine, having a disagreeable odour, and which cause head-ache and nausea when respired; if this adulterated chloroform is agitated with pure and strong oil of vitriol, it renders the latter dark brown, and thus affords a good test of their presence, as well as a means of removing them; a rough, though very correct method of determining its purity is by allowing a few drops to evaporate on the hand, if it contains wood spirit or oily matters, their odour is at once perceptible; and the liquid should not be employed medically, unless it totally disappears, leaving no evident smell.

USES.—It has been extensively and successfully made use of since its introduction, as the best means of relieving pain and removing sensation for a time, thus, in all surgical operations of severity, or those requiring protracted and troublesome manipulation, it is invaluable; for diminishing the pains of labor it is also much employed in Scotland, but less frequently in this country and in England, although some practitioners have even here used it largely; in the operative department of midwifery it is especially of service. When applied locally, chloroform excites considerable heat, and if its free evaporation is prevented, would even blister the surface; by taking care that this does not occur, it may be rubbed to the skin, and is a useful remedy in some forms of tic doloreux and painful nervous affections.

On inspiring it, after a few seconds there is usually perceived a noise in the ears, swimming before the eyes, and a numbness and thrilling is felt over the body, gradually sensation disappears from the extremities, then from the trunk, perception soon ceases, and the person falls into a state that exactly resembles the insensibility of intoxication; indeed, the effects of chloroform, ether, and alcohol, have important similarities; thus, they all operate most rapidly when their vapour is inspired; they all have a stage of excitement preceding perfect anæsthesia, and by habit, their power of producing the exciting stage seems always increased, while the insensibility follows more slowly and imperfectly than with those unaccustomed to their effects; the period of excitement, or drunkenness, is longest with alcohol, so is its insensibility, which lasts for hours; and its danger is proportionate, of this terminating in coma through imperfect æration of the blood, or in sudden death by syncope. With ether, the stage of excitement, though often well marked, and attended with rambling and incoherent expressions, is soon over, insensibility succeeds, and is usually protracted for half an hour, or upwards, after which the patient falls into a heavy sleep, for some time longer; its danger is less than that from alcohol, and, apparently, because its effects terminate sooner. With chloroform, the increased excitement is not well seen, except in nervous patients, or drunkards, in whom an additional quantity of the agent is necessary to cause insensibility; in general with healthy and temperate individuals, anæsthesia ensues in about thirty to sixty seconds, and is rarely delayed beyond two minutes, it lasts about ten or fifteen minutes, and must then be renewed by another application. With chloroform the danger appears reduced to its minimum, and I have never seen any ill consequences follow its use, or known of any fatal instance from its influence, in this country. While under its effects, if the pulse beats quietly, and respiration is carried on, there is no danger; but patients occasionally faint, as they are liable to do under any operation; and if the respiration is not carefully attended to, there is a risk of sudden death; besides, the use of this, or any other agent, to an inordinate extent in causing insensibility, may so interfere with the æration of the blood, as to produce death from congestive apoplexy, or paralysis of the contractible powers of the heart, the chambers of which will be distended with black blood.

DOSE.—About f℥ss of good chloroform seems, in general, sufficient to produce insensibility; for some, much more is requisite, as f℥ij to iv, or even beyond this, in rare instances. It should never, if possible, be employed in any other than a recumbent posture; most, if not all the accidents under its use being traceable to neglect of this important rule; and it is best applied upon a handkerchief or towel, loosely held over the patient's mouth, yet at a slight distance from it; the object being, not to exclude air, but to permit its free respiration when impregnated with vapour of chloroform; as this is very dense, the towel must be held so as to allow of its gravitating as much as possible, and the head kept quite level, otherwise the vapour will be liable to pass over the face and chest, without being inspired.

Internally, it has been given in doses of gtt ij to iv, in water, for asthma; but its effects, when administered in this manner, we are not yet acquainted with.

ANTIDOTES.—None; in cases of accidents following its use, the body should at once be placed in a recumbent position, artificial respiration speedily and steadily induced, and stimulants, as ammonia, applied to the nose.

ALCOHOL AMYLICUM, D. ($C_{10}H_{11}O+HO.$)

Fusel Oil.

This liquid, which is also known by the term of oil of potato-spirit, similar to wine alcohol, and pyroxilic spirit, constitutes one of the chemical alcohols, that is, it has a suppositious base or radicle, termed amyle, of which it is an oxide, united to water, Ayl O,+HO, as wine alcohol is a hydrate of the oxide of ethyle, AeO+HO; it also yields an ether, and when oxidized, an acid similar to acetic and formic acids, named valerianic acid, as it was discovered in the *Valeriana officinalis;* to obtain this it is now introduced into the Dublin pharmacopœia. Amylic alcohol is an oily, colorless fluid, having a peculiar, powerfully suffocating odour, and acrid taste ; its dens. is ·818 ; when ignited it burns with a blue flame ; it is soluble in alcohol or in ether ; in the air it undergoes little change ; when acted on by strong oxidizing agents, it forms the valerianic acid ; it boils at 268°.

Preparation.—Take any quantity of the light liquid, which may be got at a large distillery, by continuing the distillation for some time after the pure spirit has been all drawn off; introduce it into a small still, or retort, connected with a condenser, and distil with heat; as soon as the oil begins to come over unmixed with water, the receiver should be changed, and the distillation being resumed, and carried nearly to dryness, the desired product will be obtained. The liquid got by the first part of the distilling will be an aqueous fluid, surmounted with some fusel oil ; the latter, though impregnated with a minute quantity of water, should be kept, being pure enough for use.

VALERIANIC ACID. ($C_{10}H_9O_3$.)

This acid is of interest, chemically, from its similarity to acetic and formic acids ; and medically, from the increasing employment of its preparations ; it forms a thin, colourless oil, having a persistent odour of valerian ; its dens. is ·937 ; its taste is acid, and it reddens litmus paper ; when burned it yields a bright but smoky light ; it absorbs a little water, and is slightly soluble in it ; usually when set free from its combinations, it is procured in union with three atoms of water, one of which is basic ; at 347° the pure valerianic acid boils ; by D. it is only employed when united with a base.

Sodæ Valerianas, D. *Valerianate of Soda.*

Preparation.—Commercial oil of vitriol f℥viss, water f℥x, mix, and when cool, add it to bichromate of potash, in powder ℥ix, melted in boiling water Oiijss, and also cooled, place them in a matrass, add fusel oil f℥iv, and mix well by repeated shakings, until the temperature, which at first rises to about 150°, has fallen to 80^c or 90°. Now connect the matrass with a receiver, apply heat, and distil about cong. ss ; let this, when exactly saturated with solution of caustic soda Oj or a sufficiency, be separated from a little oil which floats on its surface, and evaporated until the escape of aqueous vapour having entirely ceased, the residual salt is partly liquified, then withdraw the heat, and, when it concretes, while still warm, divide it into fragments, and keep it in a stoppered bottle.

In this process the fusel oil $C_{10}H_{10}+2Aq$ is decomposed, becoming oxidized by the agency of oxygen, derived from the bichromate of potash and sulphuric acid ; it may be considered as losing the 2Aq and absorbing 2O when it is changed into $C_{10}H_{10}+2O$ or valerianic aldehyd, as an intermediate product, some of which distils over as an oily fluid, and is separated, the greater part, by absorbing two additional atoms of oxygen, is converted into valerianic acid $C_{10}H_{10}O_4$; this is then saturated with soda and crystallized, it yields a sweet-tasted, whitish mass, very like manna, which is used to prepare the other valerianates.

Valerianas Ferri, D. *Valerianate of Iron.*

Preparation.—Sulphate of iron ℥iv, convert it into a persulphate, as directed in the form for *Ferri peroxydum hydratum*, and add distilled water until the solution has the bulk of f℥viij, when cold, mix it with valerianate of soda ℥v ʒiij, dissolved in distilled water f℥x, and also cold; place the precipitate that forms on a filter, wash it with distilled water f℥x, and let it be dried by placing it for some days rolled up in bibulous paper on a porous brick. Keep it in a stoppered bottle.

In this process double decomposition occurs, the persulphate of iron and valerianate of soda, forming valerianate of iron, which precipitates, and sulphate of soda, which is removed by washing.

This is an amorphous, brick-red powder, having the taste and odour of valerianic acid; it is insoluble in cold water, or in alcohol; by boiling water it is decomposed, depositing red oxide of iron and the valerianic acid dissolving; its composition is stated to be seven atoms of the acid, in union with three of the oxide of iron. In medicine it is but little employed; its effects are considered to be the combined properties of its constituents; it may, therefore, be used in chlorotic and nervous affections, as chorea, &c.

DOSE.—Gr. j to iij, twice or thrice daily, in pill or powder.

Zinci Valerianas, D. *Valerianate of Zinc.*

Preparation.—Dissolve valerianate of soda ℥iiss, sulphate of zinc ℥ij ʒvij, each in distilled water Oj, heat both to 200°, mix them and skim off the crystals produced: evaporate the solution at a temperature not exceeding 200°, until reduced to f℥iv, removing the crystals in proportion as they form, and placing them with those already obtained. Steep the salt, thus procured, in as much distilled water as just suffices to cover it, then transfer it on a paper filter, on which it is to be first drained, and then dried, at a heat not exceeding 100°.

Valerianate of zinc forms brilliant, white, pearly crystals, having a feeble odour of valerian, and a rather disagreeable taste; it dissolves in water and in alcohol; by most acids it is decomposed, valerianic acid being disengaged; if heated to 122° it softens, and by a higher temperature is totally destroyed, leaving a residue of oxide of zinc. It should be kept in stoppered bottles, and in the dark, as by exposure to air, it gradually decomposes; it is often badly prepared, and acetate of zinc, perfumed with oil of valerian, has been substituted for it; it should be completely soluble in water, and its odour ought not to be strong, as it always is in the impure, or decomposing preparations.

Uses.—It has been highly recommended in neuralgia, tic doloreux, and hysterical affections attended with pain.

Dose.—Gr. ss to gr. ij in pill, or some simple water, thrice in the day.

Quinæ Valerianas, D. *Valerianate of Quinine.*

Preparation.—Dissolve valerianate of soda 124 grains, in distilled water f℥ij, and muriate of quina ʒvij, in distilled water f℥xiv, heat both solutions to 120°, but not higher, mix them, and set the mixture by for twenty-four hours, when the valerianate of quina will have become a mass of silky acicular crystals; press these between folds of blotting paper, and dry them without artificial heat.

Instead of weighing out ʒvij of muriate of quina, and dissolving it, we may use the solution prepared from ℥j of the sulphate, as directed in the formula for *quinæ murias*, such solution being first evaporated, to f℥xiv. If it is necessary to evaporate a liquid containing valerianate of quina, care must be taken that its temperature does not rise higher than 120°.

This salt has a bitter taste, and a feeble odour of valerian, it dissolves in 110 parts of cold water, and is soluble in alcohol and oil, its crystals are unchanged by exposure to the air. Valerianate of quinine is employed as a tonic, and like quinine as an anti-periodic; it is stated to possess considerable power over some obstinate forms of intermittent disease, and neuralgia.

Dose.—Gr. j twice or thrice in the day in pill, it has also been employed externally in liniments by dissolving gr. x in f℥j of olive oil.

PETROLEUM BARBADENSE, L. PETROLEUM, E.

Barbadoes Tar.

In several localities, an oily substance exudes from the ground; when liquid, transparent, and colourless, or pale yellow, it is termed rock oil or naphtha, the composition of which is C_5H_4. *Barbadoes tar* resembles treacle in consistence, it is black or reddish brown, with a bituminous taste, insoluble in and lighter than water, burning with a dense smoke, and leaving a carbonaceous mass. *Asphalte, or mineral pitch*, is a solid resinous substance obtained in nature, and also by the oxidizing of Barbadoes tar when exposed to the air, or as a residue after distilling it. These substances are found on lakes or springs of water, in Barbadoes, Trinidad, and other West India isles, at Colebrookedale in England, and oozing from the earth in Persia, on the shores of the Caspian sea, and in great abundance at Ranan-goong on the Irawaddy; their source is probably the destructive subterraneous distillation or decomposition of vegetable matters, as some specimens, when accurately examined, have yielded products similar to the distillation of coal.

Although contained in the materia medica, Barbadoes tar is now disused; it was prescribed for tape worm, obstinate skin diseases, and old catarrhal affections, and used externally as a liniment in chronic rheumatism. By the chemist, mineral naphtha is employed to preserve potassium and sodium, as it contains no oxygen, unlike the other liquids known by the same name.

DOSE.—Of petroleum ʒj.

CRÉASOTUM, D. L. E. ($C_{14}H_9O_2$.) *Kreosote.*

When quite pure, kreosote is a combustible, colourless, oily liquid, of a peculiar tarry odour, or rather like smoked meat; its taste is caustic and burning, it is soluble in acetic acid and in caustic potash, and powerfully coagulates albumen, its dens. is 1066, D. it dissolves in water in two proportions, one part and a quarter of kreosote being soluble in 100 parts of water, or 100 parts of kreosote are capable of holding in solution ten parts of water; it does not affect test paper, and boils when heated to 397°.

Preparation.—The heavy oils which distil over from wood tar, contain kreosote mixed with several impurities; they are freed from acetic acid by the addition of carbonate of potash, and distilled; any ammonia which passes over is then neutralised by phosphoric acid, and removed by again distilling; from the product, kreosote is dissolved out by means of caustic potash, which destroys organic matters, and leaves undissolved a substance termed eupion, on decomposing the potash solution with oil of vitriol, kreosote is obtained free, and purified further by repetitions of the latter part of this process.

IMPURITIES.—Eupion, capnomor, and fixed oils have been found in kreosote, its solubility in potash, or in its own volume of acetic acid separates it from these substances; it should be colourless, and unchanged by exposure to the sun's light, which has the effect of darkening it when impure, and rendering it yellow or brownish.

USES.—Kreosote is frequently applied to relieve aching in decayed teeth, upon a pellet of cotton; as a caustic, when concentrated, it is occasionally used for ulcers, and is more frequently prescribed, dissolved in water as a lotion, or in the form of ointment, when it has considerable powers in causing granulations to form; with some skin diseases, as chronic eczema and porrigo, similar applications have been employed. To check the bleeding of leech bites or wounds, a solution of kreosote is sometimes advised, and from its effects in coagulating albumen, it is a good styptic; for some forms of intestinal hemorrhage, it was employed with the same intention, but its principal use when administered internally is to allay nausea and vomiting, it often arrests these affections when dependant on pregnancy or hysteria, yet frequently fails in the irritability of stomach that attends malignant disease, and some consider that its exhibition is contra-indicated, when there are symptoms of gastric inflammation present; in the vomiting attendant on Bright's disease of the kidney, it is thought to be useful by some practitioners, and also advised to relieve the distressing effects of sea sickness. For diabetes, it has been tried, and like other remedies for this malady, not with uniform success, though it is found in some instances to relieve it considerably.

If a large dose of kreosote is taken, it acts as a caustic and irritant poison, combining chemically with the albumen of the tissues; fʒij has terminated life in thirty-six hours.

ANTIDOTES.—Mucilaginous drinks and albumen, followed by emetics.

DOSE.—Gtt j to ij in emulsion with mucilage or yolk of egg and water, or made into a pill with powdered liquorice, and repeated in two or three hours; the dose may be gradually increased to gtt v or vi; forty drops have been taken, but such a quantity is dangerous, and a single drop beyond this has caused severe symptoms. For lotions, gtt ij to vj may be added to water f℥j, and care should be taken that it is quite dissolved before applying it.

Unguentum Creasoti, D. L. *Ung: Creazoti*, E. *Kreosote Ointment.*

Preparation.—D. Ointment of white wax ʒvij, melt with moderate heat, and add kreosote fʒj, stir until cool.

E. Lard ℥iij, melt and add kreosote fʒj.

L. Lard ℥j, kreosote fʒss; mix.

The D. ointment is twice as strong as L. and may be advantageously diluted with lard before using it; its odour is the chief objection to its employment.

Mistura Creasoti, E. *Kreosote Mixture.*

Preparation.—Kreosote and acetic acid of each mix xvj, dissolve and add gradually water f℥xiv, and then syrup and compound spirit of juniper, of each f℥j.

Dose.—f℥j to ij, each f℥j contains one minim of kreosote.

SUCCINUM, D. L. *Amber.*

Amber was known to Thales 600 years B.C., its Greek appellation is the source of the term electricity, which is derived from its power of attracting light substances when rubbed, being the first material possessing this quality that was discovered. Amber appears to be a fossil resinous substance, as it often contains insects and portions of the wood of some species of pine; it is principally found on the shores of the Baltic, cast up by the sea between Konigsberg and Memel; the pieces are of irregular size and bulk, opaque or translucent, their colour varying from pale yellow, to a milky hue, or dark brown; when strongly heated, amber yields a fluid containing acetic acid, and afterwards succinic acid and a yellow oil, the *Oleum succini,* D. and L.

Preparation.—L. Put amber into an alembic, so that an acid liquor. an oil, and salt contaminated with the oil may distil in a sand bath, with a heat gradually increased; afterwards let the oil distil again and a third time.

Oil of amber is rubefacient, and is supposed to constitute the active part of Roche's once famous embrocation for hooping cough, which may be prepared from olive oil, coloured with alkanet root f℥ij, oil of amber f℥j, oil of cloves f℥j. Neither the oil of amber, or succinic acid are used internally; they were once thought to be stimulating and emmenagogue.

PART II.

BOTANICAL INTRODUCTION,

EXPLANATORY OF THE TERMS EMPLOYED IN BOTANY.

The vegetable world is classed into two kingdoms; the flowering plants, and those that are flowerless, termed also cryptogamic. Flowering plants are divided into two sub-kingdoms, 1st. EXOGENS, or those growing by successive additions to the outside of the wood, and 2nd. ENDOGENS, or those that increase by additions to its centre.

A flowering plant contains the following parts which are usually described in botanic arrangements:—

The *root*, formed of descending and dividing fibres of the stem, fixing the plant in earth, and absorbing nourishment through its spongy ends, termed *spongioles*; roots are variously named according to their shape and appearance; when thickened, as in the dahlia, they act as reservoirs of nutrition.

The *stem* is between the root and leaves; sometimes it creeps beneath the surface, if it runs along the ground, giving off roots from its under part, it is known as a rhizome; thickenings of stems are called tubers, as in the potato, and a distended underground root is termed a corm, an example of which we have in the colchicum. In Exogens, the stem grows by wood deposited in layers outside the wood of the previous year, as in our forest trees, a section of which presents, beginning from the centre, 1st, the pith; 2nd, the medullary sheath surrounding the pith; 3rd, the wood in concentric layers; 4th, the bark which is connected to the pith by medullary rays; this bark consists of an outer layer of epiderm, then epiphlœum, and mesophlœum, which are two varieties of cellular tissue, and the inner layer of the bark is known as the liber, it lies next the young wood or alburnum. Endogens grow by fibres which descend from the leaves in the central cellular tissue, and curve outwards as they pass down, hence in this sub-kingdom, there is no distinct pith, medullary rays, wood, or bark, their outer coating therefore can never be separated from the parts beneath it.

A *bulb* is a bud of large size, formed underground; its roots are the fibres which precede from its under surface while growing, as in the onion or squill.

Buds are collections of scales or rudimentary leaves around a growing vital point. They spring from the end of a stem, or the axils of leaves, and in growth elongate upwards, forming a new stem, and downwards they send fibres in the form of roots.

A *leaf* is usually a thin expanded tissue of green colour, varying much in shape, in general it consists of a *lamina* or blade, traversed by ramifying veins from the *petiole* or stalk which unites it to the plant, and sometimes the lamina is covered on one or both surfaces by minute apertures, termed *stomata* or breathing pores. In Exogens, the veins of leaves are branched and anastomosing; in Endogens, on the contrary, they run parallel, or are connected by single unbranched veins; the midrib is the chief vein of a leaf, and the larger veins proceeding from it, are known as ribs or nervures; there are two layers of these veins in leaves, the upper which carry the juices from the stem to the leaves for elaboration, and the lower which return them to the plant. Leaves are normally developed above each other alternately, from opposite sides of the stem; often, in consequence of the intermediate portion of the stem not being developed, the leaves become placed opposite each other, or several arise around the same spot, when they are termed verticillate. *Stipules*, are fringed leafy appendages on the sides of the petiole, as in the rose; there may be two, or one of these, or they may be altogether absent.

All flowers arise from buds similar to leaf buds, springing from the axil of a leaf, which is then entitled a *bract;* a *spathe* is a single bract largely developed, and rolled about the flowering part as in the common arum; an *involucre* is a collection of several verticillate or imbricated bracts around the compound flowers, termed umbels or capitulum.

When a single flower is formed at the end of a branch, the inflorescence is named, terminal and solitary, as the rose, and a single flower arising from the axil of a leaf, is designated, solitary and axillary, as in belladonna; a *raceme* is a branch with all its buds forming flowers, each with distinct stems or pedicles, an example of which we have in the currant; a *spike* is a raceme without pedicles, as the lavender; an *umbel* is the arrangement of flowering seen in conium maculatum, and other umbelliferous plants; a *capitulum* is an umbel, wanting pedicles, and contained in a dilated axis termed the receptacle, examples of it are found in the thistle and taraxacum; a *panicle* is a form of raceme from which arises other flowering branches; if all the lower peduncles elongate, so that the flowers are of an equal height, it is then termed a *corymb*, as in the apple tree.

A *flower* consists of envelopes and sexual organs, all these are considered to be modified forms of leaves; when there is but one whorl of floral envelopes, it is named the *calyx;* if there are two rows, the outer alone is designated a calyx, and the inner is known as a *corolla*; when they are not easily distinguished, the entire is termed *perianth*, but if there be no envelopes, the flower is described as *achlamydeus* or naked. Where the margins of floral envelopes are united, it is botanically known as the tube, and where they separate, is called the limb.

A *calyx* in general is green, its divisions are *sepals*; if these are distinct, it is entitled polysepalous, and if united, monosepalous.

The *corolla* usually is coloured, its divisions are the *petals;* if they are separate, the flower is described as polypetalous, and if adherent, as monopetalous; according to the form that they assume, the calyx and corolla have different names applied to them, thus, the latter is designated papilionaceous as in the pea, labiate in the mints, campanulate in belladonna, &c.

The *stamen* arises within the corolla, it is the male organ, consisting of a *filament* or stem, supporting the *anther*, which is a case divided into cells containing *pollen* or fecundating powder; as the flower matures, this case opens and discharges its contents. When the stamens adhere to the calyx, they are termed perigynous, as in the rose; when they arise below the ovary, they are hypogynous, as in a ranunculus, and if united to the calyx and the surface of the ovary, the term epigynous is applied to them, examples of which arrangement we have in the umbelliferous plants. If a flower has four stamens, two of which are long, and two short, they are described as *didynamous*, as in the digitalis or foxglove; when there are four long stamens, and two short ones, as occurs in the natural order cruciferæ, of which the wallflower is an instance, they are named *tetradynamous.*

The filaments sometimes unite in a tube, as in the mallow tribe, which arrangement is termed monadelphous; if forming two parcels, as in the pea, they are named diadelphous, if in many bundles, the term polyadelphous is employed. In the order compositæ, the anthers adhere by their margins, a disposition which is signified by the appellation syngenesious.

Disk is a term applied to the space between the stamens and ovary, which is not found in all plants; when fleshy, and bearing a single row of carpels, it is named the gynobase, if it has more than one row, it is called a torus, or receptacle.

A *pistil* is the female portion of a plant, it is found in the centre of a flower, and consists of an *ovary* or hollow case, containing one or more *ovules*, the embryos of future seeds; from the ovary arises a *stigma*, or moist secreting surface which receives the pollen; the stigma may be sessile, that is, placed on the top of the ovary, or separated from it by a hollow tube called the *style*. The term *carpel* is also applied to the ovary. Each carpel is considered to be a modified leaf, its edges turned inwards, and adhering to each other; from this line of adhesion, the embryos frequently arise, forming what is termed a marginal placenta; there may be only one carpel, as in the pea, two as in henbane, several united as in the orange, or distinct, as in the mallow. All flowers do not contain male and female organs; sometimes there is only one sex present, if this be a pistil, the flower is designated fertile or female, and when it consists of stamens alone, the flower is termed male; when those male and female flowers blossom on the same plant, as in the oak or pine, it is designated *monœcious*; if they grow, each on different plants, they are described botanically as *diœcious*, an instance of which arrangement we have in the hop plant. The ovary may adhere to the sides of the calyx, producing what is termed an inferior ovary, as in the apple tree; when no such adhesion exists, it is described as a superior ovary, an example of which we meet in the cherry.

The *fruit* is the matured pistil, to which some of the floral envelopes are at times united; the ripe ovary covering the seeds, is entitled a *pericarp;* it consists of an outer coating or epicarp, an inner endocarp, and a middle part or sarcocarp; these may be readily distinguished, as in the plum, or they may form a uniform substance, like a nutshell. When the ripe pericarp does not open to discharge the seeds, it is called indehiscent; when it opens, it is distinguished as dehiscent, and the portions into which it splits are its valves. As a single flower may contain many carpels, the partitions or dissepiments, where they meet, must all be vertical; a partial absorption of these may occur, leaving a central cavity, as in the poppy, or a one-celled ovary may arise from their total obliteration, similar to a hazle nut. Spurious dissepiments may form vertically or horizontal, and stramonium is an example of a two-celled ovary, forming four chambers by this spurious division.

Fruits may be simple, derived from a single flower, as the apple, or compound arising out of many flowers, like the pine-apple or fir cone; they are variously designated according to their different forms. A *follicle* is that species of fruit that opens by a ventral suture, having no dorsal one, for example, hellebore; a *legume* or pod is met in the bean and pea; a *drupe* is the botanical term of a fruit like the plum or almond; an *achenium* is an indehiscent, hard, one-seeded pericarp, not adhering to the seed, and seen in the labiate plants; a *capsule* is a many-celled, dry, dehiscing fruit, as star anise; a *siliqua* is formed of two adhering carpels, having parietal placentas, it is met in the family of the cruciferæ, and when very short, is designated *silicula*; a *nut* or *glans* is a dry one-celled fruit, arising from a three-celled pistil, as the hazle nut and acorn; its involucre is termed a capsule; a *cremocarp* is produced by two achenia adhering together, it is seen in the umbelliferæ; a *berry* is a juicy fruit with loose seeds in its pulp, as the gooseberry; a *pome* is composed of inferior carpels and a fleshy pericarp, resembling an apple; and a *pepo*, consists of three carpels forming a fleshy indehiscent fruit, such as the colocynth or melon.

The *seed* or matured ovule is attached by a funiculus to the placenta, which arises from the ovary; if the placenta expands over the seed, as in the mace of a nutmeg, it is named an *arillus*, and the scar marking the attachment of the placenta is called the *hilum* or umbilicus. The seed is covered by its proper integuments, in these a small foramen or micropyle is often visible opposite the future root; the seed itself, essentially consists of the embryo, and usually with this there is some albumen.• The embryo has a *plumule* or growing bud, a *radicle* or young root, and *cotyledons*, analogous to leaves; if there is only one cotyledon, or if they are placed alternately, the plant is termed monocotyledonous, an arrangement of parts which is peculiar to the sub-kingdom of Endogens; if there are two or more cotyledons, situated opposite each other, they are designated dicotyledonous, this is peculiar to the Exogenous plants.

Flowerless or cryptogamic plants form the groups of ferns, mosses, lichens, fungi, and algæ; they reproduce their kind by spores, which may germinate from any point of their surface; although far exceeding the flowering plants in number, and of the utmost interest botanically, they are of trivial importance in a medical point of view.

I. DICOTYLEDONS OR EXOGENS.

Grow by additions around their outside, but under their bark; they are dicotyledonous, having two or more cotyledons placed opposite each other, and their leaves have branching veins, forming a net-work. They consist of great groups.

THALAMIFLORALS	Having a calyx and corolla, distinct petals, and hypogynous stamens.
CALYCIFLORALS	Having a calyx and corolla, petals united, bearing the stamens.
COROLLIFLORALS	Having a calyx and corolla, distinct petals, and perigynous stamens.
MONOCHLAMYDEÆ	Having a calyx alone, or no floral envelope.

II. MONOCOTYLEDONS OR ENDOGENS.

Grow by additions to their centre; they have but one cotyledon with their embryo, or if more than one, they are disposed alternately; their leaves have parallel veins.

In addition to these divisions, plants are grouped, according to the botanical classification at present employed, into families, as they resemble each other more or less intimately in general appearance, thus, we have the rosaceæ or plants with flowers like the common rose; the leguminosæ or those distinguished by having a fruit like the pod of a pea; and the coniferæ or those possessing fruits similar to the fir or pine. Several such groups have been made by botanists, but only those of medical interest will be detailed.

EXOGENS. 1*st.* *Thalamiflorals.*

RANUNCULACEÆ. *The Crow Foot Tribe.*—Herbs or shrubs, often climbing; leaves usually with a dilated petiole and palmate or digitate blade; calyx of three to six sepals; petals from three to fifteen or absent; stamens numerous, anthers adnate, ovaries numerous or united in a single pistil.

HELLEBORUS NIGER, L. E. *Black Hellebore.*

An herbaceous plant, calyx of five large persistent sepals resembling ordinary petals; the petals eight to ten, small, tubular, and nectariferous; follicles nearly erect, many seeded; leaves radical, on stalks, four to eight inches long, stiff and smooth; flower large, white.

Black hellebore is so called from the colour of its root, and Christmas rose from flowering in winter; it is found in the woody regions of low mountains in middle and southern Europe. Its root is imported from Hamburgh, and sometimes from Marseilles, it consists of the rhizome or root stock which is half an inch thick, and some inches long, numerous fibres arise from it, of dark brown colour outside, and whiter in the centre; its odour is feeble, like senega root, its taste is sweet, then bitterish and acrid, by keeping its acridity diminishes, and it becomes less active. It has not yet been fully analyzed. Vauquelin ascribes its effects to acrid volatile oil, and Feneulle, to combined fatty oil and volatile acid.

ADULTERATIONS.—The roots of Helleborus viridis, and fœtidus, are mixed with it, this addition is unimportant; the root of Actæa spicata is sometimes discovered, its stronger fibres, cut transversely, present the form of a cross.

USES.—The ancients esteemed it as a cathartic, yet it is rarely used now; it was given in mania, melancholia, and dropsy; some consider it is emmenagogue and anthelmintic. In excessive doses, it acts as a narcotico-acrid poison, causing vomiting, pain in the stomach and bowels, purging, cramps, faintness, and insensibility.

DOSE.—Gr. iij to viij as a purgative; gr. x to ℈j operate as a drastic cathartic; it may be given in powder or tincture.

Tinctura Hellebori, L. *Tincture of Hellebore.*

Preparation.—Black hellebore root bruised ℥v, proof spirit Oij; macerate fourteen days, and strain. *Dose.*—fʒss to fʒj.

DELPHINIUM STAPHYSAGRIA, L. E. *Stavesacre.*

Biennial; two or three feet high, stem downy, leaves broad and palmated; flowers purplish in lax racemes; calyx coloured, deciduous, irregular, the upper sepal elongated into a spur; petals four, the two upper with appendages included within the spur; capsules three, large.

The seeds are used, they come from southern Europe, and the Levant; their form is imperfectly triangular, about the size of a pea, they have a faint disagreeable odour, and acrid bitter taste. Externally their surface is brownish and dotted, and the nucleus is, white and oily. They contain about eight per cent of an uncrystallizable alkaloid delphinia, with fatty oil, gum, and starch. Delphine ($C_{27}H_{19}NO_2$) is got by dissolving an alcoholic extract of the seeds in boiling water, acidulated with sulphuric acid, and precipitating the delphine with ammonia from the filtered solution; it is a white, odourless power, of acrid, bitter taste, scarcely soluble in water, though soluble in ether and alcohol; with acids, it forms bitter salts, difficult to crystallize. Couerbe states, it is mixed with an acrid resin, staphysain.

USES.—The seeds are employed to kill pediculi, in ointment, with four parts of lard, or as an infusion in vinegar. Delphine rubbed on the skin causes heat, tingling, and slight redness; it is used in an ointment of delphine ʒss, lard ℥j, olive oil ʒj; or a tincture composed of delphine ℈j rectified spirit f℥ij may be applied locally for neuralgic pains. Internally, Dr. Turnbull has given it for rheumatism, and painful nervous affections.

DOSE.—The twelfth of a grain of delphine every three hours.

ACONITUM NAPELLUS, D. L. E. *Aconite or Monkshood.*

Its appearance varies, hence several species are described; the plant is perennial, its root tapers, and sometimes has attached two or three lateral tubers; stem simple, two to six feet high, leaves palmate; flowers blue, in a raceme, calyx petaloid, irregular, deciduous, the upper sepal helmet shaped; petals five, the two upper on long stalks, prolonged at the apex into a bag hidden beneath the helmet; the others small, sometimes absent; ovaries three.

This plant is found wild in the mountainous forests of Europe, and is cultivated in gardens in this country, where it is popularly termed purple rocket. L. orders the variety known as aconitum paniculatum, which is asserted to have been used by Störk. Aconite root is tapering, three or four inches long, with many fleshy fibres arising from it; its colour is brown, and internally whitish; its taste bitter, followed by tingling and numbness of the lips, tongue, and fauces; the tubers are in perfection when the plant has done flowering, as they produce the rootstocks for the next year; the leaves are stated by Geiger to loose the power of benumbing the lips, as the seeds form, and when they ripen, the leaves become inert, although the seeds are then strongly acrid; when carefully dried, the plant remains good for years. Its activity is traced to an alkaloid, aconitine; a volatile acrid principle is also described, which Pereira considers may be produced by decomposed aconitine; it also contains aconitic acid, said to resemble equisetic acid, and when its juice is evaporated, it deposits crystals of aconitate of lime.

EFFECTS.—In large doses it is highly poisonous; Dr. Fleming states, that it may kill, first, by producing a powerful sedative effect; secondly, by paralysis of the respiratory muscles, causing asphyxia; and thirdly, by syncope, which is commonest, when the case lasts some hours. When taken, it causes within a few minutes, numbness and burning heat in the throat and stomach, pain in the abdomen, diminished sensibility of the skin, vertigo, loss of sight, hearing, and speech, dyspnæa, collapse, and sudden death within one to eight hours; the mind being unaffected by it, or there is only slight delirium. On examination, the brain and its membranes are found gorged, and sometimes there is vascularity of the mucous membrane of the intestines.

In moderate, repeated, medical doses, it causes heat, tingling of the limbs, and slight diuresis; when chewed, it rapidly produces a sensation of numbness, with tingling of the lips and tongue, which may last for hours and extend to the throat; and if an extract of aconite is applied to the eye, the pupil contracts. Dr. Lombard and others praise it as almost a specific in acute rheumatism, for which the extract is given in doses of gr. ss or more, frequently repeated; it is asserted to have cured in two to six days, and to give relief in one or two hours after the first dose; for rheumatic pains, without inflammatory symptoms, it was also found very effectual. Applied locally in neuralgic affections, over the seat of the disease, it frequently affords ease, and in many instances effects a cure, after one or more applications, though like other remedies for these painful attacks, it often fails; it appears most useful when they are not attended with inflammation. For other diseases in which aconite was recommended, it has been found of but little service, as in cancer, hypertrophy of the heart, and passive dropsies.

ANTIDOTES.—Tannin is advised, but cannot be relied on; emetics should be given, and stimulants, as ammonia, brandy, strong coffee, &c., with heat externally. If convulsions arise, Dr. Fleming directs blood to be drawn from the jugular vein.

Tinctura Radicis Aconiti, D. *Tincture of Aconite.*

Preparation.—Take aconite root, dried and cut small, ℥x, rectified spirit Oj; macerate for fourteen days, strain, express, and filter.

Applied locally for neuralgic pains, being rubbed to the part. Internally, it may be given in doses of gtt v, thrice daily; gradually increasing the quantity by gtt j, every day, until some manifest effect is produced; its employment requires great caution.

Extractum Alcoholicum Aconiti, Dr. Fleming. *Alcoholic Extract of Aconite Root.*

Preparation.—Distil off the spirit from the tincture, with care, until an extract remains. It is brownish or black coloured, and of a bitter taste.

Dose.—The sixth of a grain every three or four hours in pill or draught; or it may be applied externally in an ointment, when mixed with twice its weight of lard (Dr. Turnbull), and spread on lint or adhesive plaster.

Extractum Aconiti, L. E. *Extract of Aconite.* (*Leaves.*)

Preparation.—L. Fresh aconite leaves ℔j, moisten with water, bruise in a stone mortar, express the juice and evaporate it, unstrained, to a proper consistence.

E. Beat aconite leaves into a pulp, express the juice, and percolate the residue with rectified spirit, as long as the spirit passes through coloured; mix the expressed juice and the spiritous infusion, distil off the spirit, and evaporate the residue in a vapour bath, removing the extract when it is of proper consistence.

The L. extract is very uncertain; that of E. is preferable, as spirit is employed to dissolve the active part.

Dose.—Gr. j to ij, gradually increased until some effect is produced.

Aconitina, L. *Aconitine.*

Preparation.—Take dry, bruised, aconite root, ℔ij, boil with rectified spirit cong. j, for an hour in a retort; collect the spirit that distils over, in a receiver; pour off the liquor in the retort from the aconite, and boil the root again with another gallon of spirit, and the spirit that distilled over; repeat the process a third time; express the aconite, mix all the liquors together, strain, and distil off the spirit. Evaporate the residue to an extract, dissolve this in water, strain and evaporate with gentle heat, to the consistence of syrup. Add dilute sulphuric acid, mixed with distilled water, enough to dissolve the aconitine; then precipitate the aconitine by ammonia. It is purified by re-dissolving it with dilute sulphuric acid and water, adding animal charcoal, shaking it frequently with this for a quarter of an hour, straining, and again precipitating by ammonia, then washing and drying it.

Aconitine exists in the plant, united with a vegetable acid; the sulphuric acid displaces this, forming a sulphate of aconitine, which is afterwards decomposed by the ammonia, and the aconitine precipitated.

As aconitine is difficult to prepare, it is sold at a high price, which limits its use; and when well made, the alcoholic tincture is a good substitute for it. If genuine, it is white and odourless, easily fused, but not volatile, with a stronger heat it decomposes; it is so powerful, that the fiftieth part of a grain has endangered life; aconitine has not been got in crystals, and is considered amorphous; it dissolves in ether, alcohol, and very slightly in water. A spurious, inert aconitine is sold, of greyish yellow colour; when burned, this leaves some chalk, while the pure salt is destroyed.

USES.—By Dr. Turnbull it is employed in ointment, consisting of aconitine gr. xvj, olive oil gtt xvj, lard ℥j, mixed, and applied with the finger, for several minutes, to neuralgic and rheumatic pains; the skin should not be abraded, or its use might be dangerous. It is never given internally, from its highly active properties.

Solutio Aconitinæ. Solution of Aconitine.

Preparation.—Aconitine gr. viij, rectified spirit f℥ij, dissolve. It is applied externally, by means of a small sponge.

MENISPERMACEÆ—*The Cocculus Tribe.*—Shrubs with sarmentaceous, flexible stems; leaves alternate; flowers small, unisexual, often diœcious; floral envelopes in one or several rows; stamens monadelphous, or distinct; anthers opening outwards; ovaries numerous, each with one style, sometimes united in a many-celled fruit, occasionally, by abortion, one celled; drupe berried, one-seeded; embryo large, curved in albumen, radicle superior.

COCCULUS PALMATUS, D. L. E. *Calumba Plant.*

Root perennial, having several fleshy tubers, brownish and warty externally, deep yellow within, very bitter and odourless. Its stems are annual, herbaceous, twining, and covered with glandular hairs; the leaves alternate, nearly orbicular, 5 to 7-lobed, with wavy edges and long hairy foot-stalks; racemes axillary, flowers small, diœcious, green; calyx of six sepals, in two series, with bracteoles; petals six in the male, enclosing six stamens; anthers two-celled, dehiscing vertically; females, ovaries, three united at the base; drupes one-celled, one-seeded, about the size of a nut, with long hairs, and tipped with a black gland.

Calumba grows wild in the thick forests of Mozambique; the male and female plants were described in 1830, by Sir W. Hooker, from specimens brought by Captain Owen to the Isle of France. The roots are dug in March, the hot season, and the offsets from the main root cut in transverse slices and dried in the shade. They are imported in flat, circular pieces, measuring half an inch to three inches across, and from a quarter to half an inch thick; the cortical part is two or three lines in thickness, and has a brownish cuticle; the cut surface is greyish yellow, consisting of three or four concentric rings, softer than the cortex, and depressed in the centre, from sinking while drying; the odour of calumba is faint, its taste is bitter, mucilaginous, and slightly aromatic; one-third of it consists of starch; it also contains a crystallizable bitter substance, Calumbin, $C_{12}H_7O_4$, soluble in 40 parts of rectified spirit, or much less acetic acid; the plant yields, as well, some odorous volatile oil and resin. When good, calumba-root breaks easily; if soft or black, it is considered of bad quality; sulphate of iron, gelatine, or tartar emetic, give no precipitate with its infusions, shewing the absence of tannin or gallic acid.

ADULTERATIONS.—American, or false calumba, the root of Frasera Walteri, has been sold for it; this does not become blue with iodine, like genuine calumba, it is blackened by salts of iron and precipitates with gelatine. Bryony-root is also said to have been used as an adulteration; it is known by its acrid and bitter taste.

USES.—Calumba is a good tonic, slightly aromatic, and without astringency; it is given in dyspepsia attended with loss of appetite, nausea, and flatulence; and, as it allays irritability of stomach, it is prescribed to check vomiting, when unattended with inflammation; in the sickness of pregnancy, bilious vomiting, or that caused by calculi of the kidney, or by the use of emetics, it is often beneficial, as also for the emesis and diarrhœa of dentition. For chronic diarrhœa, and dysentery, when its acute stage has subsided, calumba may be used with advantage, and in bilious diarrhœa it is also of service; from its utility in these diseases, it is known as dysentery root in Germany.

DOSE.—Gr. v to xxx, in powder.

Infusum Calumbæ, D. L. E. *Infusion of Calumba.*

Preparation.—D. Calumba-root in coarse powder, ʒiij, *cold* water f℥ix; macerate for two hours and strain, the product should be about f℥viij.

L. Calumba sliced ʒv, boiling distilled water Oj, infuse for two hours in a covered vessel and strain.

E. Calumba in coarse powder ʒiv, moisten with cold water, and percolate cold water, until f℥xvj of infusion are obtained.

Dose.—f℥ss to f℥ij. It soon decomposes, owing to a substance in the infusion, termed animal matter by Planchè. Hot water renders the infusion turbid, from extracting starch, which is leftundissolved by using cold water; the D. form is preferable to E., which is troublesome. Iron salts, alkalies, or acids, may be added to this preparation, without apparent change.

Tinctura Calumbæ, D. L. E. *Infusion of Calumba.*

Preparation.—D. Calumba, in coarse powder, ℥v, proof spirit Oij, macerate 14 days, strain, express, and filter.

L. Calumba sliced ℥iij, proof spirit Oij, macerate 14 days, and filter.

E. same form as L., digest 7 days, strain off the clear liquor, express the residue, and filter. It is better made by percolation, reducing the calumba to moderately fine powder, soaking it in spirit for six hours, and then percolating.

Dose.—fʒi to ij, added to draughts and mixtures.

ANAMIRTA COCCULUS, E. *Cocculus Indicus Plant.*

A strong climbing shrub, with ash-coloured, deeply-cracked bark; leaves, 8 to 12 inches long; petiole a little shorter than the leaves; flowers diœcious, in racemes, sepals 6, in a double series, with two close-pressed bracteoles; no corolla; stamens in a central column, apex dilated; anthers many. Female flowers unknown; drupes 1 to 3, one-celled, one-seeded; seed globose, deeply excavated at the hilum, albumen fleshy; cotyledons very thin and diverging.

Cocculus berries are the fruit of a climbing plant growing on the mountains of Malabar, whence they are imported through Bombay, Ceylon, &c.; formerly they came by the Mediterranean, and were termed Levant berries. They resemble the berry of the bay, but are smaller; externally they are blackish brown and wrinkled; within this is a white, woody, bivalved shell, enclosing a white, oily, very bitter seed, which never fills the entire shell, and by keeping, dries away, so that the old shells are often empty; hence, E. directs that "the kernels should fill at least two-thirds of the nut." In 1834 it was analyzed by Pelletier; its poisonous principle is termed picrotoxine $C_{12}H_7O_5$; the nucleus yields from one to two per cent of this substance; it is white, crystallizing in needles, plates, or granules, and tasting intensely bitter; it dissolves in 150 parts of cold water, in one-half its weight of ether, or in less of alcohol; it does not combine with acids, but, forming compounds with alkalies, it is considered to be an acid, although feebly so. The shell yields a crystalline white matter, named menispermin, which saturates acids; it is stated to have no medical powers; paramenispermin, yellow alkaline matter, starch, lignin, &c., are also found in the fruit.

EFFECTS.—Cocculus is considered poisonous to all animals, and employed for destroying game and fish; barbel appear to die slowly under its influence, and their flesh, when eaten, has often caused accidents. The berries are extensively imported yearly, for adulterating porter, beer, &c., although their sale or purchase for this purpose is prohibited, under heavy penalties; to escape which, an extract is sold, known as B.E., or black extract, as if for the use of tanners; it is added to give factitious intoxicating power to the beer. In medicine, cocculus indicus is seldom employed; externally, it has been used in powder to destroy vermin, and in ointment, as a stimulant to chronic skin diseases, as porrigo and scabies; for these Jager prescribed an ointment of picrotoxin gr. x, mixed with lard ℥j; it should be used with care, and only where the skin is unbroken, as it is poisonous.

Unguentum Cocculi, E. *Cocculus Ointment.*

Preparation.—Take any quantity of cocculus indicus, separate and preserve the kernels, beat them well in a mortar, first alone, then with a little lard, adding it until it amounts to five times the weight of the kernels.

CISSAMPELOS PAREIRA, D. L. E. *Pareira Brava.*

A climbing woody shrub with woody branching root; stem round, smooth or downy; leaves peltate, smooth above, and silky on the under surface. Flowers diœcious, in racemes, small and yellow. Males, sepals four in a double series, petals four in a cup shaped corolla, stamens monadelphous, with 2 two-celled anthers opening horizontally. Female of one lateral sepal, with one petal in front of it; ovary solitary, stigmas three; berries scarlet, hispid, one-seeded.

The Pareira Brava, or wild vine, also termed velvet leaf, and by the Germans gravel root, from its medical properties, is a climbing Brazilian plant. Its root is imported in cylindrical pieces, from the length of a few inches to a foot or more; its thickness varies from half an inch to three inches; externally is a dark brown cortex, furrowed longitudinally, and transversely wrinkled; internally, the wood is porous, of yellowish grey colour, with a number of concentric annular layers, often very irregularly disposed at one side, and traversed by many radiating medullary rays; the root is odourless; its taste is sweetish with some aroma, and afterwards bitter. It yielded Feneulle, a soft resin, a yellow, bitter active principle, brown colouring matter, starch, vegetable matter, nitre and some other salts. Wiggers has found an alcaloid in it termed cissampelin, which is soluble in acetic acid.

USES.—Pareira is tonic, and usually operates as a diuretic; in large doses, it may act as an aperient. Formerly it was considered to have the effect of dissolving calculi in the bladder; it is now prescribed only for mucous discharges from the genito-urinary system, in which Sir B. Brodie considers it is more useful than uva ursi, and that it has considerable influence in checking the mucous secretion, and diminishing the inflamed and irritated state of the bladder; he employs a concentrated decoction with tincture of hyosciamus, &c., and if there is any deposit of the triple phosphates, the mineral acids may be added to the mixture.

DOSE.—ʒss to ʒj in powder; this is an unpleasant mode of employing it.

Infusum Pareiræ, D. L. E. *Infusion of Pareira.*

Preparation.—D. The root bruised, and torn into shreds, ℥ss, boiling water f℥ix, digest one hour in a covered vessel, and strain off about ℥viij.

L. E. Pareira ʒvj, boiling water Oj, macerate for two hours, and strain (through linen or calico, E.). *Dose.*—f℥j to iv.

Decoctum Pareiræ, Brodie. *Decoction of Pareira.*

Preparation.—Pareira ℥ss, boiling water Oiij; boil gently down to Oj, and strain. *Dose.*—f℥viij to xij daily.

Extractum Pareiræ, L. E. *Extract of Pareira.*

Preparation.—As extract of gentian, L. As extract of liquorice root, E. *Dose.*—Gr. x to ʒss in pills, or added to the infusion.

PAPAVERACEÆ. *The Poppy Tribe.*—Herbs or shrubs with milky juice; leaves alternate, without stipules; sepals two, deciduous; petals, three, four, or some multiple of these numbers, crumpled before expanding; stamens hypogynous, generally numerous. Fruit one-celled, with parietal placenta, seeds numerous.

PAPAVER RHŒAS, D. L. E. *The Corn Poppy.*

Stem many flowered, with spreading hairs; leaves pinnate, with jagged toothed lobes; petals scarlet; capsule smooth, nearly globose, with eight or ten rays in the sessile stigma.

It grows wild in corn fields and road sides, flowering in June or

July ; the petals should be collected soon after the flower expands, as they rapidly fall off; they have a slight opiate smell, and bitter taste, but when dried, become violet coloured and odourless. They are considered slightly narcotic, though only used in medicine for their colour; this is rendered black with alkalies, and destroyed by chlorine.

Syrupus Rhœados, L. E. *Syrup of Red Poppy.*

Preparation.—Add red poppy petals ℔j, gradually to boiling water Oj, heated in a water bath, often stirring them, then remove the vessel, and macerate for twelve hours ; express the liquor, and when the dregs subside, add sugar ℔iiss, and dissolve it.

Used.—For colouring, particularly in mixtures with acids, which brighten it. This syrup does not keep well from fermenting; in its preparation the fresh petals should be preferred, as they give out their colour easier. *Dose*—f℥j to ij.

PAPAVER SOMNIFERUM, D. L. E. *The White Poppy.*

An annual; stem smooth, glaucous, leafy, two to six feet high ; leaves alternate, sessile, large, with wavy, toothed margin. Flowers large, terminal, drooping before flowering, with two deciduous sepals, and four petals; capsules globose, large and smooth, having many oily, kidney shaped seeds.

There are two varieties, or according to some authors, distinct species, the Papaver officinale or album of Gmelin, having white seeds and petals; and Papaver somniferum or nigrum, with coloured flowers and black seeds.

It is probably a native of Persia, where it was cultivated at an early period, and is still grown, as well as in Egypt, Asia Minor, India, and various parts of Europe. The poppy heads, *Capsulæ Papaveris,* are in general gathered when ripe as directed by D. and L. but they are more active if collected before ripening, and dried in the sun, as ordered by E. They are globular, about the size of an apple having on the top their starlike stigma ; their odour is faint ; the seeds, termed mawseed, are numerous, full of oil which they yield by expression, and have no narcotic effects. Poppy heads contain a small but variable quantity of morphia ; the following preparations are made from them.

Decoctum Papaveris, D. L. E. *Decoction of Poppies.*

Preparation.—D. E. Poppy heads, sliced or bruised ℥iv, water Oiij, boil for ten minutes (15, E.), in a covered vessel, and strain.

L. Poppy heads ℥iv, water Oiv, boil for fifteen minutes, and strain.

Used as a fomentation to painful or inflamed parts, as the eye in ophthalmia, to ulcers, to joints when sprained, to the abdomen in enteritis or peritonitis, to cancer, &c.; and it may be employed as an injection into the vagina or rectum in affections of these organs, attended with pain. Chamomile flowers are often added to poppy stupes, they appear merely to aid in retaining the heat for a longer period.

Extractum Papaveris, L. E. *Extract of Poppies.*

Preparation.—Macerate bruised poppies, without the seeds, ℥xv, in boiling water cong. j, for twenty-four hours; boil down to Oiv, strain while hot, and evaporate to a proper consistence (by a vapour bath, E.).

Its effects are similar to opium, and it is supposed to be less liable to cause head-ache, nausea, or constipation.

Dose.—Gr. ij to xv.

Syrupus Papaveris, L. E. *Syrup of White Poppy.*

Preparation.—L. Dry poppies bruised, without the seeds, ℔iij, boiling water cong. v; boil down to cong. ij, and express strongly while hot; again boil down the strained liquor to Oiv, and filter while hot; set it by for twelve hours, until the dregs subside, then boil the clear liquid down to Oij, and dissolve in it sugar ℔v.

E. Poppies ℔iss, boiling water Oxv; macerate for twelve hours; then boil down to Ov, express strongly through calico, and again boil down to Oij; add sugar ℔iij, and dissolve by heat.

This is much employed as an anodyne for children; its use is not free from danger with young infants, from the small quantity of opium that they bear, and the varying strength of the syrup, which is often improperly made by mixing laudanum with treacle or simple syrup, hence D. has substituted for it a syrup of the muriate or acetate of morphia of definite strength, which may be employed in the same doses as the former syrup of poppies. Cases are reported in which a teaspoonful of this preparation has proved fatal to infants; it is used to allay pain, to cause sleep, and to ease cough when troublesome; for the latter purpose it is often added to pectoral mixtures for adults.

Dose.—Gtt v to f℥ss for infants of two or three months old; f℥ij to iv for adults.

OPIUM, D. L. E.

Opium is prepared by making incisions horizontally into the capsule of the poppy, a few days after the flower leaves have fallen, taking care that the cut does not penetrate the inside of the fruit; a milky juice exudes, and concretes into a viscid mass, or into small grains or tears, if more dried; this is collected next day with blunt knives, and the agglutinated tears mixed with about one-twelfth their weight of the scraped epiderm of the poppy, constitutes Turkey opium; elsewhere it is gathered in a softer state, and beaten into a mass with saliva; all the varieties of opium are then enveloped in leaves, &c., before selling it. From 30, to 50,000 pounds weight of this drug are annually imported; its dens. is 3·36; water dissolves about two-thirds of it when good, forming a brownish solution which contains most of its active principles; the narcotine and a viscid mass like caoutchouc remain insoluble in the water; opium is nearly all dissolved by rectified spirit or ether. It has been repeatedly analyzed; its composition is complex, and it yields morphia, narcotine, codeine, thebaine, narceine, meconine, meconic acid, resin, oil, gum, caoutchouc, albumen, odorous principle, lignin, and inorganic salts. The chief kinds of opium are:—

Smyrna, *Turkey*, or *Levant Opium*, produced in several places around Smyrna; that grown about 600 miles distant at Caisar is considered the best; it is imported in round or flattened masses, weighing from ℔ss to ℔ij, and covered with the capsules of a variety of rumex, or sometimes with poppy leaves; when fresh, it is soft and reddish brown, with a waxy lustre; by keeping, it becomes hard and darker coloured; its taste is bitter and unpleasant, and its odour is strongly opiate, Guibourt considers it to consist of agglutinated tears; it yields about eight per cent of morphia or twelve of muriate of morphia, and four of narcotine.

Constantinople Opium is in large, flat, irregular cakes; another description forms small lenticular pieces, about two inches in diameter, covered with a poppy leaf, the midrib of which marks it; rumex capsules are never found on this variety, and it is more mucilaginous than Smyrna opium; it yielded Guibourt, about half as much morphia as that from Smyrna, though Duncan and others have obtained fourteen to fifteen per cent of the muriate of morphia from it.

Egyptian Opium is in flat round cakes, three inches in diameter, and covered with some leaf; its colour is reddish, not darkening when kept, its composition uniform, its odour is musty and feeble, and it affords six to eight per cent of morphia.

Persian or Trebizond opium, described by Pereira, was imported some years ago in cylindrical sticks enveloped in paper, its colour is dark like socotrine aloes, its taste very bitter, and it contains but little morphia.

Of *Indian Opium*, two varieties are described, the Bengal and Patna. The former is in hard, round balls, weighing ℔iij to iv each, and packed into chests which contain about forty of them; each ball is surrounded by an envelope of agglutinated poppy leaves, weighing near ℥xiv; the opium is blackish brown, of the consistence of a soft extract, with a pure opiate smell; this variety, termed Chinese investment opium by Royle, is said to yield two and a half per cent of morphia. Garden Patna opium, forms square cakes, weighing ℔ij to iv each, covered with layers of mica, and outside this is a casing of brown wax; its colour is brown, its structure uniform, with a strong opiate odour, and it has seven to ten per cent of morphia. Malwa opium is in flat round cakes, covered with a greyish dust, and weighing ℔iss each; some years since this description was considered very inferior, but is now made with more care. Some other Indian opiums are described, but are seldom met with, and are unimportant.

English Opium is rarely made, from the great cost of labour; its quality is very fine, being equal, if not superior, to the best Turkey opium. French, German, and Algerine opium are also known, though never imported into this country.

Composition.—The analysis of opium has been mentioned; it yields morphine, which will be afterwards described:—

Narcotine, $C_{48}H_{24}NO_{15}$, an alkaloid, discovered by Derosne in 1803; it is dissolved out by ether from opium, which contains from one to eight per cent of it in a free state. Narcotine forms insipid, shining, colourless crystals, insoluble in cold water; it was supposed to have narcotic or stimulant effects, but is now thought to be nearly inert. The bitterness of its solution in sulphuric acid has led to its use instead of quinine, in agues, for which Dr. O'Shaughnessy, of Calcutta, employed it with considerable success.

Codeine, $C_{35}H_{20}O_5N$, discovered by Robiquet in 1832, is a white crystalline alkaloid, of which opium contains from one half to one per cent; its effects are little known. Dr. W. Gregory states that in doses of gr. v it causes excitement like intoxication, followed in a few hours by depression and nausea.

Thebaine, or Paramorphine, $C_{25}H_{14}O_3N$, is a crystalline alkaline substance, like narcotine, but tasting acrid, and not bitter. Magendie states that its effects are like strychnine.

Narceine, $C_{28}H_{20}O_{12}N$, a neutral substance, discovered by Pelletier; it forms silky needles, slightly bitter, soluble in water, and producing with iodine, a blue compound similar to that from starch; it is considered inert.

Meconine, $C_{19}H_5O_4$ contains no nitrogen, it forms white, six-sided prisms, fusing at 194°, and soluble in water; it is a neutral substance; when chlorine is passed over fused meconine, it forms a blood-red fluid, which crystallizes on cooling. Its effects are unknown.

Meconic acid, $C_{14}HO_{11}$, discovered by Serturner, is in colourless, pearly scales, soluble in four parts of boiling water, but decomposing if boiled into carbonic and komenic acids. It has only been found in the poppy tribe, and its detection is often an important legal point; its characteristics are, that with perchloride or persulphate of iron it forms a blood-red colour; this is very delicate, and is distinguished from the red hue caused by sulpho-cyanogen with persalts of iron, by the latter disappearing on the addition of solution of corrosive sublimate; the persalts of iron are also reddened by other substances, as the acetates, infusion of white mustard, indigotic acid, &c. Meconic acid is probably inert; it was advised as an antidote for corrosive sublimate; but its scarcity renders it useless in practice, even if it had the effect that is asserted.

The other components of opium, except morphine, are of minor importance, and they need not be described.

ADULTERATIONS.—The quantity of moisture in opium is liable to vary, some varieties being quite soft, while others are hard enough to powder; this is often overlooked in dispensing the drug, although it is an evident source of difference in its strength, and L., therefore, directs all opium to be dried before using it for making preparations. The amount of morphia is also variable in different specimens; thus, when it is obtained from one locality, it may yield less than one per cent., whilst another description may afford as high as twelve or thirteen per cent., the average being about ten, from good opium; and it has even been sold after extracting all the morphia from it. Sand, molasses, cowdung, and powdered poppy-seeds, have also been used to adulterate it, and Pareira has found, in one specimen, ʒx of stones and gravel, in ℥x of opium; therefore, in purchasing large quantities, the amount of morphia contained in it should be ascertained; this may be done by dissolving an aqueous extract of opium in warm water, adding then a slight excess of ammonia, and when cool, collecting, washing, and drying the precipitate, mixing it with proof-spirit, and adding acetic acid gradually, until it slightly reddens litmus; the acid dissolves the morphia from the narcotine, and it can be finally precipitated from the clear filtered liquid, by ammonia. (Thiboumary's process modified by Pareira.)

EFFECTS.—In small doses, opium acts as a stimulant, although this is not invariable; it causes increased frequency of pulse, warmth, and a state of exhilaration, with rapid succession of ideas that have but little permanence, and there is often a tendency to muscular exercise; this state is succeeded by lassitude, with inclination to sleep. It is the excited condition that is the object of an opium-eater, and which leads to a repetition of the practice; and since through use, the ordinary dose soon looses its effects, they are obliged rapidly to increase it. In full medical doses the stage of excitement is short, or altogether absent; the pulse becomes slower, pain if present, is diminished, a dreary state of inaction succeeds, external impressions are indistinctly perceived, and within half an hour the person falls into a slumber, lasting from six to twelve hours, and sometimes attended with dreams; on waking, nausea is often felt, or severe headache, and constipation, which may continue for some days.

When poisonous doses of opium are taken, giddiness and stupor soon occur, followed by heavy sleep, the person lying motionless, and breathing slowly; he may be roused by loud speaking, or shaking, to answer a question, but again relapses into stupor, which gradually deepens into a comatose state, with stertor; the skin, which has been warm and sweating, becomes afterwards cold, the pulse imperceptible, the face ghastly, and death usually occurs from twelve to twenty-four hours after taking the poison; though instances are recorded where three or five hours have elapsed before its effects commenced, and, on rare occasions, a longer interval may occur.

As a stimulant, opium is used in many parts of the world; the Chinese smoke it, the Turks swallow an extract of the drug, and in these countries many employ it in the liquid form, or by eating solid opium; this habit has been thought by most authorities to be fraught with the worst consequences—dooming those using it to premature disease and decay; yet, the truth appears to be, that this opinion is rather exaggerated. They who employ opium habitually, in this country, may be divided into two classes, those having ordinary health, that use it secretly instead of dram-drinking, and who, for this reason, seldom disclose the fact; and those unfortunate persons labouring under painful diseases, as cancer, or chronic diarrhœa, who take it to procure alleviation of their sufferings, in enormous and rapidly increasing doses; and, as they are always under observation, the conclusions as to the effects of opium are often drawn from their symptoms instead of the first class, whom the practitioner rarely meets The use of opium, like dram-drinking, may, it is possible, be persevered in for a long time, and even to some excess, without causing any manifest derangement of health in those enjoying ordinary strength; but if the constitution is bad, or the indulgence unbounded, it can then produce serious injury; and, like drunkenness, the habit creeps on rapidly, and obtains such influence, that few as there are who can resist the continued use of alcohol, fewer appear capable of relinquishing their dose of opium. The use of this drug, too, is most general among the lower orders of a country, and its effects worst, as they are ill-fed and clothed, and have not the power of restraining themselves from inordinate indulgence in it.

Medically, it is employed as an anodyne, to allay pain; Dr. Corrigan proposes it, with this intention, to cure inflammatory rheumatism; he directs full doses, as gr. j every three hours during the first day; if this does not afford relief, he gives it every two hours next day, and on the third day, every hour, continuing it until the disease is subdued; the patient is easy under its use, and does not become narcotised; and he considers this great tolerance of the drug, a sign of its doing good. Dr. Hope recommended in this disease gr. iss or gr. ij of opium and gr. vij to x of calomel every night, followed by infusion of senna and Epsom salts next morning; when the pain abated, or the gums became tender, he omitted the calomel, continuing the opium, and in severe attacks, giving gr. j additional, at noon. In gout and chronic rheumatism it is also prescribed to allay pain, or when calculi are passing along the ureters, or gall duct, or in inflammation of the pelvis of the kidney, from a calculus. In colic, full opiates frequently afford relief; and for senile gangrene, Pott proposed it as a remedy; it is still employed, not to cure this disease, but to ease the severe pain attending it. In neuralgia, for painful ulcerations, cancer, difficult menstruation, to allay the afterpains of labor, &c., it is most useful, and with the same view it is used in poisoning by the corrosive poisons, to diminish suffering. In inflammatory diseases opium is often beneficial, for those affections in particular, attended with much pain aggravating the disease; but it does not appear to have any of those powers, which mercury has, of checking the effusion of lymph, or causing its re-absorption; its effects are frequently very great after free bleeding in enteritis or peritonitis, when given in full doses; and in the intense, and usually fatal peritonitis, following perforation of the stomach or intestines, or rupture of the bladder, large opiates afford the only chance of recovery, or at least, of alleviating the patient's suffering.

In inflammations of mucous membranes, especially of the bowels, opium is of much value; ordinary diarrhœa often yields to a moderate dose of it, which diminishes both the pain and mucous secretion; for English cholera it is used to allay the spasms and irritable state of the stomach attending this affection; sometimes calomel is combined with it, in doses of gr. v to xx, and in mild cases, two or three doses of opium alone may cure this disease; in dysentery, given in the early stages, this drug often checks it, and opiate enemas are prescribed to relieve the painful tenesmus; for chronic dysentery, small doses of its preparations are of use, when frequently repeated and joined with tonics and astringents.

For delirium tremens it is given in large doses, as gr. ij or iij, every three or four hours; some practitioners employ solid opium, but a solution of it is preferable, being easier absorbed; camphor is sometimes added to increase its efficacy, and Dr. Law has employed a combination with tartar emetic, which is highly successful in some instances. In tetanus, opiates have been largely used; there is a remarkable tolerance of them in this disease, so that enormous doses can be given without causing proportionate symptoms; however, as many cases of chronic tetanus recover under any treatment, it is difficult to decide on the value of different remedies for its cure. During insanity, opium is often of service; it is indicated when restlessness, or prolonged want of sleep continues after full evacuations; and for this class of diseases it has been exhibited in enema, or applied to blistered surfaces, when it could not be given by the mouth.

The use of this drug in chest affections requires care; it is improper in the first stage of acute catarrh, from checking secretion, which is its natural termination; and, from its effects in diminishing the action of the respiratory muscles of the chest, and also, probably, of the bronchi, it is objectionable in suffocative catarrh, and in chronic bronchitis with excessive discharge, permitting such an accumulation of mucus as fills up the air tubes, and interferes with the changes of venous into arterial blood, causing either speedy or slow suffocation; when used with judgment it is of benefit in chronic catarrh, with severe cough and not very abundant expectoration, where it allays the irritated sensibility of the bronchi, and is often prescribed in the troublesome cough of phthysis, and in some forms of asthma, combined with expectorants.

As a diaphoretic it acts powerfully; thus, in most instances of poisoning by it, there is excessive sweating. Dover's powder is the combination usually given when this effect is required, for colds, rheumatic pains, diarrhœa, dysentery, &c.

In fevers, considerable difference of opinion exists as to the use of opium; it is recommended when there is a condition like delirium tremens, with watchfulness, delirium, and restlessness, when the circulation is not excited, the tongue and skin are moist, and the secretions abundant; even then it requires care, and if its desired effects are not soon produced, it ought not to be persevered in; a combination, with tartarized antimony, is proposed by Dr. Graves, as serviceable in fevers with much cerebral excitement. In small-pox, about the eighth or ninth day of the eruption, secondary fever usually arises, which may be followed by delirium, insensibility, and death; along with purgatives, opiates given once or twice in the day, are of great benefit, and also diminish the irritation of the pustules drying on the skin.

Opium is sometimes employed for hemorrhages; it is prescribed in small, repeated doses, or in one large dose, as gtt xxxx of laudanum, for uterine hemorrhage; with acetate of lead it forms a favorite prescription in hæmoptysis; and in ruptured uterus, free doses of opium after delivery, alone or combined with calomel, are most useful. In chronic, or subacute ophthalmia, wine of opium, dropped into the eye, often allays the redness, and rapidly restores the conjunctiva to a state of health.

Externally, stupes or fomentations of poppies, or containing opium, are employed to relieve pain; they have been applied to burns, but are objectionable when the surface is large, or if they are long continued, from the danger of poisoning by absorption, particularly with infants, as opium rapidly affects them, even in small doses. Opiate plasters and liniments are also employed to painful affections, old sprains, &c. Suppositories of it are introduced into the rectum, to check diarrhœa, the irritation of dysentery, the pain of ulcers, cancer, or stricture of the rectum, and sometimes for painful affections of the bladder, and prostate gland; similar applications may be used in uterine diseases, by placing them in the vagina.

ANTIDOTES.—None; the stomach-pump should be employed, and emetics, as mustard, sulphate of zinc, or ammonia, given if the patient can swallow; cold affusion, or cold and hot water, applied alternately, is found useful in rousing them from the state of coma; and the lethargy should be kept off by walking them about, using flagellation, and electro-magnetic shocks; in even desperate cases, artificial respiration has proved the means of recovery from apparent inevitable death, and it has been continued as long as two or three hours in some instances.

DOSE.—Gr. j is the average quantity; smaller doses, as the eighth to the fourth of a grain, are given in diarrhœa, catarrh, &c.; full doses, as gr. ij to iv, are used to allay severe pain. In enema, or suppositories, the amount employed is slightly more than that given by the mouth.

Extractum Opii Aquosum, D. *Ext: Opii Purificatum*, L. *Ext: Opii*, E. *Watery Extract of Opium.*

Preparation.—D. Opium ℔j, cut in thin slices and macerate for twenty-four hours in water Oij, decant and macerate the residue twice, in water Oij, for twelve hours, and strongly express the residue. Filter the infusions and expressed liquor; and evaporate them in a vapour-bath to a proper consistence.

L. Sliced opium ℥xx, boiling water, cong j; add a little water to the opium, and macerate for twelve hours that it may soften, gradually pour in the rest of the water, mix well by rubbing, and set by that the dregs may subside, then strain the liquid, and evaporate to a proper consistence.

E. Opium Oj, digest five times, each for twenty-four hours, with water Oj, filter the successive infusions as they are made, through the same filter, then mix and evaporate them in a vapour bath, to a proper consistence.

Good opium yields 60 to 70 per cent. of extract, which should therefore be more active than crude opium; in practice it is given in the same doses. It is brown or blackish, with little odour, and of bitter taste; some consider it is less exciting than opium itself; however, from careless preparation, long macerating, or over-heating, this is not always a certain remedy.

Pilulæ Opii sive Thebaiacæ, E. *Opium Pills.*

Preparation.—Opium one part, sulphate of potash three parts, conserve of red roses one part; beat into a proper mass, and divide into gr. v pills.

Dose.—One or two pills; each contains gr. i of opium.

Pilulæ Saponis Compositæ, D. L. *Compound Soap Pills.*

Preparation.—Opium in powder ℥ss, Castile soap ℥ij, (distilled water f℥ss, D.,) mix.

Gr. v contains gr. i of opium; this may also be used as a suppository.

Pulvis Cretæ Opiatus, D. E. *Pulvis Cretæ Compositæ cum Opio*, L. *Compound Powder of Chalk with Opium.*

Preparation.—D. Compound powder of chalk ℥iv ʒvij, opium in powder ʒj, mix and pass through a fine sieve.

L. Compound chalk powder ℥vjss, hard opium in powder ℈iv, mix.

E. Compound chalk powder ℥vj, opium ℈iv, mix.

Uses.—Astringent, narcotic, and antacid, used in diarrhœa The D. and L. preparation contains opium gr. j in 40 grains; E. gr. j in 37 grains.

Dose —For children gr. ij to x, according to age, and for adults gr. xx to xxxx.

Confectio Opii, L. *Electuarium Opii*, E. *Confection of Opium.*

Preparation.—L. Long pepper ℥j, ginger ℥ij, caraway ℥iij, tragacanth ʒij, powder and mix with opium in powder ʒvj; add hot syrup f℥xvj, when the confection is to be used.

E. Aromatic powder ℥vj, senega in fine powder ℥iij, opium, diffused in a little sherry, ℥ss, syrup of ginger ℔j, mix and beat into an electuary.

Uses.—Narcotic and aromatic, chiefly employed for diarrhœa, with other astringents; L. contains gr. j of opium in 36 grains, E. in 43 grains.

Dose.—Gr. x to ʒj.

Tinctura Opii, D. L. E. *Tincture of Opium, or Laudanum.*

Preparation.—D. L. Opium in coarse powder f℥iij, proof spirit Oij, macerate for fourteen days, strain, express, and filter.

E. Opium sliced ℥iij, digest in water f℥xiijss, at a temperature near 212°, for two hours, break down the opium by the hand, strain and express the infusion; macerate the residue with rectified spirit Oj f℥vij, for about twenty hours, then strain and express very strongly, mix the watery and spirituous infusions, and filter. It is not easily made by percolation; if the opium is fine it may be sliced, then mix the spirit and water, and macerate the opium in f℥xiv of the mixture, for twelve hours, then break it down thoroughly with the hand, pour the whole pulpy mass and fluid into a percolater, let the fluid part pass through, add the rest of the spirit without packing the opium in the cylinder, and continue the percolation till Oij be obtained.

D. contains, by calculation, a little more than gr. iv of opium in fʒj, L. and E., about gr. ivss; when evaporated, nearly gr. iij remain from the fʒj of any of the preparations. If freshly made, it is of a brownish red colour, which deepens on exposure to light; it can be obtained by rubbing the opium into a pulp with boiling water, and adding enough rectified spirit to bring it to the proper strength; by keeping, it acquires its usual dark hue; and it can be thus procured for use in half an hour, as perfectly as if macerated for a longer time, particularly if made in large quantities. The residue is stated to contain some morphia; if made with boiling water it is less liable to do so than that remaining after simple cold infusion.

Uses.—It is the best and most commonly employed preparation of opium, and preferable to the solid drug, from the ease with which it is absorbed, and the certainty of apportioning the dose; for young infants its use requires care, as they are easily affected by any opiate.

Dose.—Gtt vj to fʒss, or even more, in some instances. f℥ss is considered sufficient to cause death.

Tinctura Opii Camphorata, D. E. *Tinctura Camphoræ Composita*, L. *Camphorated Tincture of Opium, or Paregoric Elixir.*

Preparation.—D. Opium, in coarse powder ʒiss, benzoic acid ʒiss, camphor ʒj, oil of anise fʒj, proof spirit Oij, macerate for fourteen days, strain, express, and filter.

L. Opium gr. 72, benzoic acid gr. 72, camphor ℈iiss, oil of anise fʒj, proof spirit Oij; macerate for fourteen days, and filter.

E. Opium ℈iv, benzoic acid ℈iv, camphor ℈iiss, oil of anise fʒj, proof spirit Oij; digest for seven days, and filter.

This might always be made extemporaneously, by adding a sufficiency of laudanum to the other ingredients dissolved in the spirit. (f℥ijss of laudanum for the D. form.) It is much used as an anodyne in pectoral affections, unattended with active inflammation; it checks profuse secretion, allays cough, and over-sensibility of the mucous membrane. The name of the London preparation is useful, as it obviates the serious error of dispensing tincture of opium for this elixir; it also enables opium to be given under another name, which is occasionally desirable. A grain of opium is contained in about each f℥ss.

Dose.—fʒss to fʒiij, frequently added to other expectorants.

Tinctura Opii Ammoniata, E. *Ammoniated Tincture of Opium.*

Preparation.—Opium ℥ss, benzoic acid ʒvj, saffron chopped ʒvj, oil of anise ʒj, spirit of ammonia Oij; digest for seven days and filter.

This is known as Scotch paregoric, it is seldom used in this country; its effects resemble ordinary paregoric, but it is three times stronger, eighty minims being equal to gr. j of opium; it is also stimulating and antispasmodic from containing ammonia. *Dose.*—fʒss to fʒj.

Acetum Opii, D. E. *Acetated Tincture of Opium.*

Preparation.—D. Opium in coarse powder ℥iss, dilute acetic acid Oj, macerate for seven days in a closed vessel, strain with expression and filter.

E. Opium in small fragments ℥iv, add vinegar f℥xvj, first triturate the opium into a pulp with a little vinegar, and then add the rest; macerate seven days, occasionally agitating, strain strongly, express and filter.

As the D. formulas of tincture, wine, and vinegar of opium are now all of the same strength, this preparation is much weaker than the corresponding one of E. at least by calculation as to the amount of opium they contain; but in practice the difference is less important, gtt xx of the E. being equal to about gtt xxx of the acetum opii of D. *Dose.*—Gtt vj to xxx.

Gutta Nigra. Black Drop.

Preparation.—Opium sliced ℔ss, expressed juice of the wild crab fruit Oiij, nutmegs bruised ℥j, saffron ℥ss, boil to a proper thickness, then add sugar ℔ss, yeast two spoonfuls, place all in a warm place near the fire for six or eight weeks, and then in the open air until it becomes a syrup, lastly, filter and bottle it.

This is considered a good imitation of the celebrated nostrum of the same name, one drop of which is stated to be equal to three of laudanum; in practice it will not be found much more than half this strength.

Trochisci Opii, E. *Opium Lozenges.*

Preparation.—Opium ʒij, reduce it to a fluid extract as directed for extract of opium, mix it with extract of liquorice ℥v, reduced to the consistence of treacle, add tincture of tolu f℥ss, powdered gum arabic ℥v, powdered sugar ℥vj, beat into a mass, and form into gr. x lozenges.

Each lozenge contains about one-tenth of a grain of opium; they are used to allay cough, diarrhœa, &c.

Emplastrum Opii, D. L. E. *Opium Plaster.*

Preparation.—D. Resin plaster ℥ix, melt by a steam or water bath, then add gradually opium in fine powder ℥j, and mix thoroughly.

L. Lead plaster ℔j, melt and add powdered resin of the spruce fir ℥iij, powdered opium ℥ss, water f℥viij, and with a low fire boil down to a proper consistence.

E. Same as L., but using no water, and employing Burgundy pitch instead of resin of the spruce fir.

Applied to rheumatic and other pains; it is of doubtful utility.

Linimentum Opii, D. L. E. *Opiate Liniment.*

Preparation.—D. Soap liniment f℥j, tincture of opium f℥j, mix.

L. Soap liniment f℥vj, tincture of opium f℥ij, mix.

E. Opium ℥iss, castile soap ℥vj, rectified spirit Oij, macerate for three days and filter, add oil of rosemary ʒvj, camphor ℥iij, and dissolve.

This is termed anodyne liniment, and used for sprains, rheumatic affections, &c.

Enema Opii, L. *Enema Opii, vel Anodynum*, E.
Injection of Opium.

Preparation.—L. Decoction of starch f℥iv, tincture of opium gtt xxx, mix.

E. Starch ʒss, boil with water f℥ij, and add when it is cool enough, tincture of opium fʒss to fʒj.

Useful in diarrhœa, dysentery, inflammation of the bladder, uterus, &c. but as its strength should vary for different purposes, D. properly omits it from the preparations. Dupuytren considered that opium was more active when given in enema, than by the mouth; experience however leads to a different conclusion. Injections that are intended to remain in the bowels, should always be of small bulk, and to avoid waste, they ought to be administered with an elastic bottle, or an ear syringe having an enema tube adapted to it.

Vinum Opii, D. L. E. *Wine of Opium.*

Preparation.—D. Opium in coarse powder ℥iij, sherry Oij, macerate for 14 days, with occasional agitation, then strain with expression, and filter.

L. Purified extract of opium ℥ijss, cinnamon, cloves, of each bruised ʒijss, sherry Oij, macerate for fourteen days and filter.

E. The same as L. using opium ℥iij, and macerating for seven days.

This was formerly known as Sydenham's laudanum, it contained double the quantity of opium, with saffron ʒj, which is now omitted, and by D.

the aromatics are also disused, forming now only a simple vinous tincture of opium of the same strength as laudanum.

It is employed in chronic ophthalmia, and the latter stages of acute conjunctivitis, by dropping it into the eye; it causes sharp pain, and copious flow of tears, which soon subsiding, is followed by ease, and frequently rapid amendment. Internally it is rarely used, its *Dose* is similar to that of tincture of opium.

MORPHIA, D. L. ($C_{35}H_{20}O_6N+2Aq.$)

The most important constituent of opium, which contains two to ten per cent of it, in combination with meconic and sulphuric acids; it forms transparent, brilliant crystals, usually very minute, odourless and of a bitter taste; morphia is nearly insoluble in cold water, requiring 1000 parts to dissolve in, it melts in thirty parts of boiling alcohol, but not in ether; when heated, it fuses and burns, leaving a coally residue.

Preparation.—D. Turkey opium, in thin slices, ℔j, distilled water Oij, macerate for twenty-four hours, and decant; macerate the residue for twelve hours with distilled water Oij, decant and repeat the process, subjecting the residue to strong expression. Let the decanted and expressed solutions be evaporated by steam or a water heat to Oj, and filter through calico; now pour in chloride of calcium ʒvj, dissolved in distilled water f℥iv, and continue to evaporate till the entire nearly becomes solid on cooling; let this solid matter be wrapped in a couple of folds of strong calico, and powerfully pressed. keeping the dark liquor that exudes for subsequent use; now act on the squeezed cake with about Oss of boiling water, throw all on a paper filter and wash the precipitate well. The filtered solution is again evaporated, cooled, and solidified, and the residue subjected to expression; if the product is not quite white, this process should be repeated a third time, the liquid forced out during expression, being always preserved. Let the squeezed cake be dissolved in boiling water f℥vj, and if necessary cleared by filtering through prepared animal charcoal, the portion of it soaked by the filter being carefully washed out of it, and to the solution thus obtained, add water of ammonia, in slight excess, and let the crystalline precipitate which forms when the liquor has cooled, be collected on a paper filter, and washed with cold water, until the washings cease to precipitate with an acid solution of nitrate of silver; lastly, place the filter on a porous brick to dry the morphia.

The expressed liquids separated in the preceding process, are diluted with water to f℥iv, and then slightly supersaturated with ammonia. The precipitate which forms, collected after six hours on a filter, and washed with a little cold water. This if re-dissolved in dilute muriatic acid, boiled with a little animal charcoal, and filtered, will on cooling give a crystalline deposit, from which when pressed, dissolved in water, and supersaturated with ammonia, an additional quantity of morphia will be got.

L. Hydrochlorate of morphia ℥j, distilled water Oj, dissolve and add solution of ammonia fʒv, diluted in water f℥j, shake together, wash the precipitate in distilled water, and dry it with gentle heat.

For the explanation of the D. process, see hydrochlorate of morphia, E. In the form directed by L. the ammonia combines with hydrochloric acid, forming soluble muriate of ammonia, and pure morphia is set free and precipitated.

TESTS.—Nitric acid produces with morphia or its salts a red solution, afterwards becoming yellow; but strychnine and oils of pimento, or of cloves, react similarly. Sesquichloride of iron forms a deep blue liquid with morphia, which can afterwards be reddened by nitric acid; as gallic acid and tannin give a similar blue with persalts of iron, this test is not adapted for organic solutions. Iodic acid is decomposed by morphia, setting iodine free and forming a brownish liquid, which with starch gives the blue iodide; no other alkaloid yet known will react thus; its fallacies are, that sulphurous acid, sulphuretted hydrogen, and some other substances, decompose iodic acid as well as morphia.

USES.—Morphia is seldom employed in an uncombined state; its salts are, however, frequently used, and to prepare these it is officinal in D. and L. Its precise effects are not fully understood; by some they are considered analagous to opium, while many think it is a pure sedative, free from the stimulating properties of the crude drug. Morphia is usually deemed not much more active than opium; gr. ss being about equal to gr. j or gr. iss of the latter. In small doses, as a quarter to half a grain, it causes giddiness, drowsiness, and sleep, which may be more or less disturbed; the pupils are found contracted in the majority of persons, though rarely they are dilated; the pulse is slow, and at times itchiness of the skin is complained of. In grain doses it may occasion nausea and vomiting, and those using it sometimes suffer from a paralysed state of the bladder, producing retention of urine, which has been considered peculiar to morphia, but I have known the same effects to follow the employment of acetated tincture of opium.

In fatal doses, the symptoms resemble those from opium; they begin about five to twenty minutes after the poison is taken; there is dimness of vision, relaxation of the muscles, stupor, coma, and stertorous breathing; convulsions also occur, and are more common than in poisoning with opium itself. After death, the vessels of the brain are found engorged, and sometimes there is serous effusion on its surface; but as morphia has no local irritant effect, there are no traces of its action seen in the stomach.

The salts of morphia may be used in most instances where opium is prescribed; to which many prefer it, as it appears less liable to cause head-ache and constipation; in England it is more employed than in this country, where the general impression seems to be that the effects of crude opium, and its preparations, are better understood, and more easily made available; besides the latter acts as a stimulating and diaphoretic remedy in many affections for which morphia is not given.

Applied externally, morphia is used to allay neuralgia, severe head-ache, obstinate vomiting, or gastric pain; for this purpose a blister is applied, and the raised vesicle of cuticle being removed, gr. j to gr. iss of some finely powdered salt of morphia is dusted over the exposed cutis, which is then covered with mild dressing. By Mr. Rynd, of this city, a concentrated solution of the muriate of morphia, in water or creosote, has been employed for sciatica, tic doloroux, &c., by inoculating it over the seat of the pain with a lancet, or with an instrument devised for the purpose.

DOSE.—Morphia, or its salts, may be given in doses of a quarter to half a grain; from repetition, like opium, it looses its activity, and the dose then requires to be augmented. Mr. Taylor regards gr. ij as sufficient to prove poisonous, far less would kill a child, and even gr. ss of muriate of morphia is stated in the *Lancet*, of 1839, to have caused severe symptoms; persons, however, have recovered from ten, twenty, and even thirty-five grains of the acetate of morphia, although the least of these must be considered a poisonous dose.

MORPHIÆ MURIAS, D. E.
MORPHIÆ HYDROCHLORAS, L. *Muriate of Morphia.*

This is usually in fine snow white powder, or in downy acicular crystals, very bitter, soluble in sixteen parts of cold, or its own weight of hot water; when heated it fuses, then decomposes, and is dissipated; with tests it reacts as morphia does, and being a muriate, it gives a white curdy precipitate with nitrate of silver. Its composition is $\mathrm{Mor.HCl+6Aq}$.

Preparation.—D. Pure muriatic acid fʒivss, or a sufficiency, distilled water fʒiiss; heat to about 200°, add morphia in fine powder ℥i, constantly stirring, so that a solution may be formed having a slightly acid reaction. Let this cool for twelve hours, drain the crystals which separate from the liquor that surrounds them, and dry them on blotting paper; the decanted liquor will, by concentration and cooling, give more crystals.

L. Macerate opium sliced ℔j, in distilled water Oiv, for thirty hours, bruise it, digest for twenty hours more and express; macerate the residue again, and a third time in water, that it may become free from taste, and and as often bruise and press it. Evaporate the mixed liquids at 140° to the thickness of syrup, add distilled water Oiij, and when all impurities subside, pour off the supernatant liquid, gradually add to this chloride of lead ℥ij, or a sufficiency, dissolved in boiling water Oiv, till nothing further precipitates, pour off the liquid, and wash what remains frequently with distilled water; then evaporate the mixed liquids, as before, that crystals may form, press them in a cloth, then dissolve them in distilled water Oj, digest with animal charcoal ℥iss, in a heat of 120°, and strain; lastly, the charcoal being thoroughly washed, evaporate the liquors cautiously, that pure crystals may be got.

To the liquid poured off from the crystals first separated, previously mixed with water Oj, gradually drop in as much solution of ammonia as may precipitate all the morphia; to this, washed with distilled water, add hydrochloric acid that it may be saturated, afterwards digest it with animal charcoal ℥ij, and strain; lastly, the charcoal being thoroughly washed, evaporate the liquors cautiously, that pure crystals may be procured.

Water dissolves out of opium the morphia, with meconic and sulphuric acids, codeine, part of the narcotine, meconine, brown extractive, and some resin; on adding chloride of lead, the meconate and some sulphate of lead falls, with colouring matter, while muriate of morphia and codeia remain dissolved; on evaporation, the former crystallizes with a little codeia, and therefore impure; the mother liquids still containing morphia and a large quantity of codeia. The muriate of morphia is purified by dissolving it, and adding ammonia, when pure morphia precipitates, and a muriate of ammonia is formed in the solution; the morphia is then re-dissolved by muriatic acid, decolorized with animal charcoal, and again crystallized.

E. Take opium in fragments ℥xx, water Oviij, macerate the opium in water Oij for twenty-four hours; separate the infusion, squeezing the residue well, again macerate with water Oij, until the whole is made use of. Concentrate all the infusions over a vapour bath to Oj, and add muriate of lime ℥j, or a slight excess dissolved in f℥iv of water; set it aside to settle, wash the sediment with a little water, add the washings to the liquid, and evaporate it sufficiently in a vapour bath to solidify on cooling; when cool, strongly express it in a cloth, re-dissolve the cake in sufficient warm distilled water, add a little powdered white marble and filter, acidulate the filtered liquid with a very little muriatic acid, and concentrate a second time in a vapour bath for crystallization, strongly express the crystals in a cloth, and repeat the process of solution, clarifying by white marble and muriatic acid, concentrating and crystallizing till a snow white mass is obtained.

On the small scale, trouble and loss are saved by decolorizing with animal charcoal after the second crystallizing; but on the large scale, it is better to purify the salt by repeated crystallizings alone, and treat all the expressed fluids except the first in the same way as the original solution of impure muriate of morphia; an additional quantity of the salt may be often got from the first dark and resinous fluid obtained by expression, on merely allowing it to remain at rest for a few months, when a little muriate of morphia may be deposited in an impure condition.

The opium that yields the most precipitate with carbonate of soda, according to the formula for testing opium, yields muriate of morphia, not only in greatest proportion, but with fewest crystallizings.

This process, which is similar to that of D. for morphia, resembles, in its chemical changes, the form of L., except in using chloride of lime instead of chloride of lead, which precipitates a meconate of lime. There is also some alteration in the method of purifying the salt. Christison states that it is important not to employ too much water, about four times the weight of the opium being sufficient, and that the chloride of lead or of calcium should be added before concentrating the infusion, also the evaporation should be conducted as quickly as possible, at a heat below 212°.

IMPURITIES.—Muriate of morphia usually contains some moisture, loosing from nine to fourteen per cent by drying; and it may be brownish coloured from imperfect separation of the colouring matters, this is not common. Lately, attention has been directed to a gross adulteration; this was supposed to be salicine, as sulphuric acid reddened the salt, but was discovered afterwards to be white sugar; it is detected by precipitating the morphia from the suspected muriate, which should yield seventy-five per cent of morphia, while the impure preparation only gave fifty-four per cent. E. states that it should be "snow white, entirely soluble, the solution colourless, its loss of weight at 212° not above thirteen per cent. 100 measures of a solution of gr. x in water f℥ss, heated to near 212°, and decomposed with agitation by a faint excess of ammonia, gives a precipitate which in twenty-four hours occupies 12·5 measures of the liquid."

USES and DOSE.—Similar to the other preparations of morphia.

Morphiæ Muriatis Liquor, D. *Morphiæ Muriatis Solutio*, E.
Solution of Muriate of Morphia.

Preparation.—Rectified spirit f℥v, distilled water f℥xv, mix and dissolve muriate of morphia gr. 90, and unless the solution be quite clear, pass it through a paper filter.

This is intended as a substitute for tincture of opium, being considered of similar medicinal strength, f℥j contains nearly gr. iijss of morphia, or 106 minims are equal to gr. j of the muriate.

Dose.—Gtt x to fʒss.

Syrupus Morphiæ Muriatis, D. *Syrup of Muriate of Morphia.*

Preparation.—Solution of muriate of morphia f℥j, simple syrup f℥xvij; mix.

This is intended as a substitute of definite strength for the syrup of poppies; f℥j contains a quarter of a grain of the salt.

Dose.—fʒj to iv for adults; gtt x to fʒss for children.

Trochisci Morphiæ, E. *Morphia Lozenges.*

Preparation.—Muriate of morphia ℈j, dissolve in a little hot water; mix it, and tincture of tolu f℥ss, with pure sugar ℥xv, and with mucilage form a mass for making lozenges each of which should weigh about gr. xv.

Uses.—Sedative, to allay tickling cough, and for chronic chest affections; each lozenge contains about one fortieth of a grain of the muriate.

Trochisci Morphiæ et Ipecacuanhæ, E. *Morphia and Ipecacuan Lozenges.*

Preparation.—Made by adding ipecacuanha ʒj, to the morphia lozenge mass, and dividing into gr. xv lozenges.

Uses.—Similar to the last, each contains the thirteenth of a grain of ipecacuan in addition to the morphia.

MORPHIA ACETAS, D. L. E. (Mor. Acet+Aq.)

Acetate of Morphia.

It is usually a greyish powder, amorphous or mixed with small crystals, from being prepared by evaporating its solution to dryness with heat; and as it easily decomposes, this grey salt consists of morphia, the neutral acetate, and some superacetate of morphia, being partially insoluble in water unless acetic acid is added; when pure, it is white, in radiating crystals, and easily dissolves in water. Its uses are similar to the muriate, which appears a preferable salt, being less liable to decompose, and usually purer than the acetate.

Dose.—Similar to muriate of morphia.

Preparation.—D. Morphia in powder ℥j, rectified spirit f℥viij; apply heat, and add commercial acetic acid (dens. 1044) fʒivss, or a sufficiency, until a neutral or slightly acid solution is obtained; evaporate to the consistence of syrup by a steam or water heat, and set it by for a few days until it solidifies. In extensive operations, it may be worth while to distil off the spirit.

L. Acetic acid f℥iij, water f℥iv, mix and pour it on morphia ʒvj, to saturation, and evaporate gently that crystals may form.

E. Dissolve muriate of morphia in fourteen times its weight of warm water; when cool, add aqua ammoniæ gradually, and with constant agitation till there is a permanent but faint odour of ammonia in the fluid. Collect the precipitate on calico, and wash it moderately with cold water, and dissolve it by means of a slight excess of pyroligneous acid in twelve parts of warm water for every part of muriate of morphia that was used; concentrate the solution over a vapour bath, and set it aside to crystallize; drain, squeeze, and dry the crystals with a gentle heat; more acetate of morphia may be got by concentrating the mother liquor.

By E. morphia is obtained from decomposing the muriate, D. and L. employ it already prepared, and combine it with acetic acid to form the acetate which is crystallized. E. gives the following test of its purity, "100 measures of a solution of gr. x in water f℥ss, and acetic acid min v, heated near to 212°, and decomposed by a faint excess of ammonia, yields by agitation a precipitate which in twenty-four hours occupies 15·5 measures of the liquid."

Morphiæ Acetatis Liquor, D. *Solution of Acetate of Morphia.*

Preparation.—Rectified spirit f℥v, distilled water f℥xv; mix, and dissolve acetate of morphia, gr. 82; if the solution is not quite clear, filter it through paper.

It contains about gr. iijss of morphia, or gr. iv of its acetate in f℥j, and is the same strength as the solution of the muriate of morphia, allowing for the difference of acetic and muriatic acids, and the water in the latter preparation.

Dose.—Similar to laudanum, gtt x to fʒss.

Syrupus Morphiæ Acetatis, D. *Syrup of Acetate of Morphia.*

Preparation—Solution of the acetate of morphia f℥j; syrup f℥xv; mix.

The quantity of syrup should be f℥xvij; like the syrup of the muriate of morphia each f℥j then contains about a quarter of a grain of morphia.

Dose.—fʒj to iv for adults; gtt x to fʒss for children.

Morphiæ Sulphas, (Mor.SO_3+6HO.) *Sulphate of Morphia.*

It may be made by mixing morphia in distilled water, adding sulphuric acid until the morphia is dissolved and saturated, and then crystallizing. Its crystals are white and easily soluble in water; it is a preparation that is rarely employed in this country; its doses and effects are similar to muriate of morphia.

CRUCIFERÆ. *The Cress-worts.*—Usually herbs with alternate leaves; no bracts; sepals four, cruciate and deciduous; petals four, cruciate; stamens four long and two short, or tetradinamous; ovary superior, with parietal placentæ, usually meeting in the middle, and forming a spurious dissepiment; fruit, a silique or silicule; seeds pendant, attached with a funicle, embryo with the radicle folded on the cotyledons.

COCHLEARIA ARMORACIA, L. E. *Horse Radish.*

Root perennial, long, white and very pungent, throwing up large, smooth, deep green leaves, much veined and resembling water dock, the flower stems are erect, two or three feet high; inflorescence a raceme, silicules globose, without a dorsal nerve.

Fresh horse radish root has a pungent odour and acrid taste owing to a volatile yellow oil, soluble in spirit, and containing some sulphur, which is shown by the infusion blackening the salts of lead or of silver; this oil vesicates the skin if applied to it; drying destroys the activity of the root. It is rarely used medically, though once valued as an antiscorbutic, and also given as a general stimulant and diaphoretic in palsy and rheumatism. The scraped root is sometimes added to foot baths to render them more stimulating.

Infusum Armoraciæ Compositum, L. *Compound Infusion of Horse Radish.*

Preparation.—Sliced horse radish, bruised mustard, of each ℥j, macerate in boiling water Oj, for two hours, strain and add compound spirit of horse radish f℥j. *Dose.*—f℥j to ij.

Spiritus Armoraciæ Compositum, L. *Compound Spirit of Horse Radish.*

Preparation.—Horse radish sliced ℥xx, dried orange peel ℥xx, nutmegs bruised ʒv, proof spirit cong. j, water Oij; mix and distil one gallon.

Dose.—f℥j to iv occasionally added to diuretic infusions for dropsies; both the spirit and infusion might well be disused, as their value hardly repays the trouble of making them.

Cardamine Pratensis, L. *Cuckoo Flower.*

This is a small, bright green herb about one foot high, with large lilac coloured flowers, growing in meadows and flowering about April. The leaves taste like water cress, but less agreeably. The flowers are bitter and pungent, when dried they become inodorous; they were considered stimulant and diuretic, and employed for epilepsy in children, and for spasmodic asthma; they are now disused. *Dose.*—ʒij to iij.

SINAPIS NIGRA, D. L. E. *Common Black Mustard.*

An annual, stem two to four feet high, leaves large, rough, lyrate, the upper ones lanceolate; flowers yellow; silique small, quadrangular, with a short style; seeds dark brown, and beautifully veined externally.

Mustard is always procured in powder, ready for use; it is said to be made from a mixture of the black and white mustard seeds, ground and sifted ; they would yield a brown oily powder, very unlike the yellow one usually sold, and which is largely adulterated with wheaten flour, colored with turmeric, and ginger added to give pungence to it ; with the aid of a lens, particles of red pepper are also usually visible in this flour of mustard. By expression about twenty-eight per cent of a mild fixed oil is obtained from black mustard, which has been used as a purgative ; they also yield myrosyne, a substance like vegetable albumen ; and myronic acid a bitter odourless non-crystalline acid containing sulphur, which mixed with the myrosyne produces the volatile oil of mustard $C_{32}H_{20}O_5N_4S_5$; for this reaction water must also be present, (like the formation of bitter almond oil), the oil when pure, is colourless and very acrid ; it boils at 290°.

SINAPIS ALBA, D. E. *White Mustard.*

Stem one or two feet high ; flowers large ; silique hispid, with a long beak, seeds few and yellow.

Its seeds neither contain nor form a volatile oil, its acridity being due to a fixed acrid principle, developed in it by the action of water, and yielding some sulphur ; it also has a white, crystalline, bitter substance, sulpho-sinapisine, $C_{24}H_{22}NO_7S_2$, which is changed into sulpho-cyanogen by many acids and salts, reddening the persalts of iron ; white mustard also contains a substance termed erucin, and about thirty-six per cent of fixed oil.

USES.—Mustard is a powerfully stimulating emetic, employed in narcotic poisoning, intoxication with threatened apoplexy, suffocative catarrh, cholera, &c. ; for this purpose, mustard flour should be mixed with water and taken at once, as its acridity becomes developed, when it is mixed for some time. Whole mustard seeds were formerly given in doses of a table-spoonful to promote digestion, they are liable to form intestinal concretions, and therefore should not be used for this purpose. Mustard whey is sometimes employed as a diuretic for dropsies, it is made by boiling ℥ss of the bruised seeds in milk Oj, and straining. DOSE.—f℥iv, twice or thrice daily.

Cataplasma Sinapis, L. *Mustard Poultice.*

Preparation.—Mustard flour ℔ss, linseed meal ℔ss, warm vinegar enough to form a poultice ; mix.

As vinegar or boiling water checks the formation of the active oil, water not heated above 100° should be used ; but as nearly all the mustard now sold owes its activity to ginger or capsicum, this is less important ; in practice also, the linseed may be omitted. A sinapism acts as a powerful irritant, exciting redness, and if left on too long, vesication or even sloughing may arise; from varying sensibility to pain, some will complain of its action almost immediately, and others bear it until it raises blisters; it should never be applied above half an hour, or after the skin is reddened, particularly if the patient is insensible from paralysis, in which although the feeling may be diminished, yet the sensibility of the surface to external impressions is often increased. Sinapisms are used in the stupor and delirium of low fevers, apoplexy, or narcotic poisoning, and over rheumatic and other pains; they are applied to the chest in pulmonary affections, as acute or chronic bronchitis, pleuritic stitch, or typhoid pneumonia, or in cardiac diseases; and to the abdomen in painful affections of the viscera, during the passage of gall stones or urinary calculi, to check vomiting, &c. During 1847, when scurvy prevailed, I found the application of sinapisms was frequently attended with an eruption of purpuric spots over the irritated surface.

VIOLACEÆ. *The Violet Tribe.*—Sepals five, imbricate, extended at the base; petals five; stamens definite, filaments dilated; ovary one-celled with three parietal placentas; capsule three-valved, many seeded; embryo strait in fleshy albumen.

Viola Odorata, E. *The Violet.*

It is a small perennial creeper, with numerous cordate leaves, and purplish fragrant flowers, appearing in March; they should be gathered when first blown and carefully dried, or at once made into syrup. The root contains an alkaloid termed violine, similar in its effects to emetine, it has not been fully tried in medicine.

Syrupus Violæ, E. *Syrup of Violets.*

Preparation.—Fresh violets ℔j, boiling water Oiiss, infuse for twenty-four hours in a covered glass or earthenware vessel, strain without squeezing, and dissolve pure sugar ℔vijss, in the liquor.

This syrup is rendered brighter by infusing it in a pewter vessel; it is given ocasionally as a laxative to young children, in doses of fʒj to ij, and used as a test for acids which reddens its colouring matter, and alkalies, which turn it green.

POLYGALEÆ. *The Milk-wort Tribe.*—Shrubs or herbs; leaves alternate, without stipules; pedicles with three bracts, flowers unsymmetrical; sepals five, irregular, often glumaceous; petals usually three, hypogynous, consolidated, one being anterior and larger than the rest; stamens monadelphous, anthers innate, one-celled; ovary, with two or three cells, each with one pendulous ovule, embryo strait, with albumen.

POLYGALA SENEGA, D. L. E. *Senega.*

Root perennial, branched, with many erect annual stems, nine to twelve inches high, tinged with red inferiorly; leaves sessile, and alternate; flowers small, white, in terminal racemes; capsule small, with two black seeds.

Senega root was brought into use in 1735, as a remedy for the bites of snakes; it is found in the southern and western parts of the United States, whence it is imported in bales. The root rises from a knotty head; it varies from the thickness of a quill to that of the little finger, and is contorted and corrugated; externally, it is resinous, of a yellowish brown colour, and contains the active part; the middle is white, woody, and inert; its odour is faint yet peculiar, its taste is mucilaginous, then acrid, bitter, and nauseous. Its active principle, polygalic acid or senegin, is a white, odourless powder, at first tasteless, but afterwards acrid, and causing constriction of the mouth; senega also yields virgineic acid, a volatile reddish oil of disagreeable odour and acrid taste, with tannin, gum, lignin, &c.

USES.—In small doses, it is expectorant, sudorific, and diuretic; in large doses it acts as an emetic and purgative; it is used in decoction or infusion in the latter stages of catarrh and of pneumonia, particularly in the old or debilitated, to promote expectoration; squills, and carbonate of ammonia are often joined with it. In America it has been advised for croup, but is not employed here, except in the advanced disease, when it is given as a stimulating emetic with ipecacuanha.

DOSE.—Gr. x to xx of the powder; this is rarely prescribed, but is useful for children.

Infusum Polygalæ, D. *Infusum Senegæ*, E. *Infusion of Senega.*

Preparation.—D. Polygala root bruised ℥ss, boiling water f℥ix; digest for one hour, and strain off about f℥viij.

E. Senega root ʒx, boiling water Oj, infuse for four hours, and strain.

Decoctum Senegæ, L. *Decoction of Senega.*

Preparation.—Senega root ʒx, distilled water Oij, boil down to Oj, and strain.

The infusion is preferable, as continued boiling diminishes the activity of the preparation, and is said to render its constituents insoluble, by forming a compound with albumen and colouring matter.

Dose.—Of decoction or infusion, f℥j to iij, three or four times daily.

KRAMERIA TRIANDRIA, D. L. E. *Rhatany.*

A small shrub, much branched; roots long, creeping; stem procumbent; leaves oblong, sessile, and silky; flowers solitary, lake-coloured; calyx of four coloured sepals; petals five, irregular; stamens, three; fruit, globular, indehiscent, covered with brown prickles.

It grows on the slopes of sandy mountains in Peru, where it was discovered in 1779, by Ruiz. The root consists of several long woody cylindrical branches, often arising from a common root stock; they have a thick fibrous reddish-brown bark, without smell and strongly astringent, and a hard yellow woody centre or meditullum, with but little astringency. Rhatany root affords one-third its weight of substances soluble in water, consisting of tannin 42·6, gallic acid ·3, gum, extractive, and colouring 56·7, krameric acid ·4, in 100 parts Its medical effects are due to the tannin and the krameric acid, which Peschier describes as very styptic, and not crystallizable. Both alcohol and water extract its active part.

USES.—A powerful astringent and tonic; hence employed in passive hemorrhages, mucous fluxes as diarrhœa, old catarrhs with excessive secretion, leucorrhœa, chronic dysentery, &c. Rhatany root is sometimes used as tooth-powder; it may be mixed with equal parts of myrrh, orris, and prepared chalk, or charcoal. The root is also sold as a tooth-brush, with the fibres of one end split up.

Infusum Krameriæ, D. L. *Infusion of Rhatany.*

Preparation.—D. Rhatany root bruised ℥ss, boiling water f℥ix, infuse for one hour, and strain off about f℥viij.

L. Rhatany ℥j, boiling distilled water Oij; macerate for four hours, and strain. *Dose.*—f℥j to ij.

Extractum Krameriæ, E. *Extract of Rhatany.*

Prepared—As Extract of liquorice.

Dose.—Gr. x to xx; this extract is frequently much adulterated; if well made it is a valuable astringent, resembling kino in appearance, and having a shining dark red colour; it is said to be extensively used to give astringency to port wine.

Tinctura Krameriæ, D. *Tincture of Rhatany.*

Preparation.—Rhatany root in coarse powder ℥viij, proof spirit Oij, macerate for fourteen days; strain, express, and filter.

Dose.—f℥j to iij, added to other astringents.

LINEÆ—*The Flax Tribe.*—Annual herbs, or small shrubs; leaves usually alternate, without stipules; sepals three to five, imbricated, persistent; petals hypogynous, twisted, fugitive; stamens united in a ring; ovary with as many cells as there are sepals; capsules, globular, each cell with two seeds, divided into separate cells by secondary partitions.

LINUM USITASIMUM, D. L. E. *Flax.*

An annual, root slender, stem erect, one or two feet high, flowers large and blue, in a corymb; capsule globular, containing ten seeds.

Flax grows wild, and is also extensively cultivated for preparing linen and for the oil got from the seeds; these, termed linseed are oval, pointed at one end, about a line long, glossy brown outside, internally white and inodorous, with an oily taste. 100 parts yield 11 of oil, chiefly contained in the nucleus, and 15 of mucilage from the husk. The mucilage is extracted by boiling water, it consists of a soluble portion like gum arabic, and an insoluble matter containing nitrogen. The short fibres of flax, removed by hackling, form tow; and the meal of its seeds, freed from oil by expression, is the *Farina Lini*, E., or linseed meal.

Decoctum Lini Compositum, D. *Compound Decoction of Linseed.*

Preparation.—Linseed ℥j, liquorice-root bruised ℥ss, water Oiss, boil for ten minutes in a covered vessel, and strain.

Infusum Lini, E. *Infusum Lini Compositum*, L. *Infusion of Linseed.*

Preparation.—Bruised linseed ʒvj, liquorice-root sliced ʒij, boiling distilled water Oj; digest in a lightly-covered vessel for four hours near the fire, and strain (through linen or calico), E.

Commonly known as flaxseed-tea, and used for a demulcent in affections of the mucous membranes, as bronchitis, dysentery, gonorrhœa, nephritis, &c.; and as an emolient enema. For internal use it may be sweetened; it is popularly understood that linseed yields a better mucilage with a second infusion than the first. D. employs a decoction which has, at least, the merit of being easily and speedily made.

Oleum Lini, D. L. E. *Linseed Oil.*

Is made by simply expressing the ground seeds in a screw press, which affords 18 to 20 per cent. of oil; or, after exposing them to a steam heat of 200°, when 22 to 27 per cent. is obtained; this is higher coloured and more disagreeable than the cold-drawn oil. The smell of linseed oil is peculiar; dens. ·932; it dissolves in 40 parts of alcohol, and if exposed to the air it dries into a transparent resinous varnish, hence it is termed a drying oil, and used in painting; this property is increased by boiling the oil with acetate of lead, or litharge. Medically it is employed in the *Linimentum calcis*, or Carron oil.

Cataplasma Lini, L. *Linseed Meal Poultice.*

Preparation.—Boiling water Oj, linseed powdered, sufficient to make it of proper consistence, mix.

In using this poultice it should not be spread too thickly; and a little oil ought to be added to it, as the seeds are expressed before powdering them.

Malvaceæ.—*The Mallow Tribe.*—Herbs or trees, with alternate leaves, often covered with stellate hairs, and having stipules; calyx valvate in æstivation; petals twisted;

stamens monadelphous, anthers kidney-shaped; ovary formed from the union of many carpels; fruit capsular, or baccate, with little albumen; embryo curved, with twisted cotyledons.

MALVA SYLVESTRIS, L. E. *Common Mallow.*

Root, perennial; stem, tapering and branched, three feet high; leaves downy, 5 to 7-lobed; flowers axillary, large, three or four together; calyx with three narrow bracteoles; petals, rose coloured, with purple veins.

The plant is found growing wild, and should be gathered while flowering, about July; its decoction is used occasionally for enemas and fomentations, as boiling water extracts much mucilaginous matter from it, mixed with a little extractive substance.

Decoctum Malvæ Compositum, L. *Compound Decoction of Mallow.*

Preparation.—Mallow dried ℥j, chamomile ℥ss, water Oj, boil for a quarter of an hour and strain.

ALTHŒA OFFICINALIS, L. E. *Marsh Mallow.*

Stem downy, two or three feet high; leaves cordate or ovate, soft and downy; flowers, three or four together, on axillary stalks, of a pale rose colour; calyx with an involucel, six to nine cleft.

It grows in marshy places, particularly near the sea; its leaves and root are used, the leaves are odourless and mucilaginous, the roots are long, cylindrical, yellow outside, white internally, and of a sweet taste; they contain mucilage, starch, uncrystallizable sugar, a substance termed althein, &c. Its uses are similar to the common mallow, or to flaxseed, which is a good substitute for it.

Mistura Altheæ, E. *Marsh Mallow Mixture.*

Preparation.—Althea root ℥iv, raisins stoned ℥ij, boiling water Ov, boil down to Oiij; strain through linen or calico, and when the sediment subsides, pour off the clear liquor.

Dose.—Oj to iij, in the day, for nephritis, stranguary, bronchitis, &c.

Syrupus Altheæ, L. E. *Syrup of Marsh Mallow.*

Preparation.—Fresh sliced althea root ℥viij, boiling water Oiv, boil down to half, (strain through linen, E. Express strongly when cold, L.,) set it aside for twenty-four hours that the impurities may subside; pour off the clear fluid, add pure sugar ℔ijss, and boil down to a proper consistence.

Dose.—f℥j to iv, used as an addition to pectoral mixtures; it readily spoils by keeping. Like other preparations of the mallows, it is falling into deserved disuse, and has been expunged from the Ph. D.

GOSSYPIUM HERBACEUM, E. *Cotton Plant.*

The cotton plants are shrubs, and one variety forms a tree; their leaves are alternate, with black dots on them; flowers yellow, purple at the base of the petal; capsule ovate, with three to five cells, each with many seeds imbedded in the down which forms cotton.

Cotton is cultivated in both India and America; its fibres are tubular hairs, which flatten when dried, and if magnified resemble a twisted ribbon having at intervals, transverse lines like joints. Its wool in the form of French wadding, is used for burns; it allays the pain, apparently by excluding air and forming a substitute for the cuticle, and should be allowed to remain undisturbed as long as possible, when it has been applied; with deep burns some employ turpentine mixed with resin cerate under the cotton, but as the slough must be detached before they can granulate, a bread poultice is preferable. For lint and surgical dressing, cotton is objectionable as it does not absorb discharges like linen; Raspail ascribes this to the fibrillæ of linen being hollow, while cotton fibres are solid and unabsorbent.

Aurantiaceæ – *The Orange Tribe.*—Smooth trees or shrubs, filled with transparent receptacles of volatile oil; leaves alternate, articulated to the petiole; flowers fragrant, white or greenish; calyx short, bell-shaped; petals three to five, outside a hypogynous disk; stamens on the disk; fruit pulpy, many-celled; seeds usually pendulous.

CITRUS AURANTIUM, D. L. E. *The Sweet Orange.*

A tree about fifteen feet high, bearing flowers and fruit together; leaves oval acute, on winged petioles; flowers large, white; fruit the orange.

It is found in the Indian forests, and is extensively cultivated in the Azores, South of Europe, and West Indies; its flowers when distilled, yield orange-flower water, and an essential oil of neroli; these may also be obtained from the bitter orange. The dried unripe fruit form orange berries, they are dark brown, of the size of cherries, and, when turned in a lathe are sold as issue peas; they have no advantage over ordinary peas for this purpose. The rind of the sweet orange should not be used medically as it is deficient in bitterness; its oil vesicles are distinguished by being convex. Its juice contains mucilage, sugar, and some malic and citric acids; it is prescribed in some febrile affections to allay thirst.

CITRUS VULGARIS, L. E. *Seville Orange.*

This tree is smaller than the sweet orange, the flowers more fragrant; branches spiny; leaves elliptical, acuminate, toothed; fruit dark orange colored, with concave oil vesicles.

It is termed citrus bigaradia by D., and is supposed to have been introduced into Spain by the Moors, as all the Seville groves planted by them are of the bitter orange; its flowers afford the finest variety of oil of neroli, and orange-flower water. The dried rind of the fruit is employed as an aromatic tonic; and, by the confectioner, both rind and pulp are used for making marmalade. The *Cortex aurantii*, D. L. E., is prepared by removing the white inner part, and drying the dark orange, fragrant, and bitter cortical portion, in slices; it enters into the following preparations:—

Infusum Aurantii Compositum, D. L. *Infusum Aurantii*, E.
Infusion of Orange Peel.

Preparation.—D. Bitter orange peel ʒiij; cloves, bruised, ʒss; boiling water Oss; infuse for half an hour, and strain off about f℥viij.

L. E. Dried orange peel ℥ss, lemon peel ʒij, cloves, bruised, ʒj, boiling water Oj; digest for fifteen minutes in a lightly covered vessel, and strain (through linen or calico, E.).

Dose.—f℥j to ij; a mild tonic, chiefly used as a vehicle for other remedies, as salines, ammonia, &c.

Confectio Aurantii, L. *Conserva Aurantii*, E. *Conserve of Orange Peel.*

Preparation.—Grate the outer rind of bitter oranges; beat it into a pulp in a stone mortar, and gradually add thrice its weight of sugar.

Used—As an addition to electuaries; it resembles marmalade.

Syrupus Aurantii, D. L. E. *Syrup of Orange Peel.*

Preparation.—Bitter orange peel ℥iiss, boiling water Oj; macerate for twelve hours in a covered vessel, strain without expression, and add to the liquor twice its weight of refined sugar (℔iij, L.), and dissolve by the aid of a steam or water heat.

Added as a flavoring ingredient to mixtures; it may be made extemporaneously by mixing tincture of orange peel fʒss, with simple syrup f℥j.

Dose.—fʒj to iv.

Tinctura Aurantii, D. L. E. *Tincture of Orange Peel.*

Preparation.—D. Bitter orange peel ℥iv, proof spirit Oij; macerate fourteen days, strain, express and filter.

L. Dried orange peel ℥iijss, proof spirit Oij; macerate for fourteen days, and filter.

E. Similar to L., macerating for seven days; or it may be made by percolation, by cutting the peel in small fragments, macerating it with a little spirit for twelve hours, and beating it into a coarse pulp before percolating. *Dose.*—fʒj or ij as an addition to mixtures or draughts.

Aqua Florum Aurantii, L. E. *Orange Flower Water.*

Preparation.—L. Take orange flowers ℔x, proof spirit f℥vij, water cong. ij, and distil cong. j.

This is brought from France and Italy, and prepared from both the sweet and bitter orange flowers; it contains some free acetic acid, which acting on the solder of the metal vessels it is imported in, may dissolve a little lead, when it will become dark coloured with sulphuretted hydrogen. Orange flower water is employed as a syrup, termed capillaire, for pectoral affections; on the Continent it is considered antispasmodic, and used for hysteria.

Oleum Aurantii, L. E. *Oil of Neroli.*

Is separated from the distilled orange water; its flavour differs in some degree from the flowers, yet is highly aromatic; its colour is reddish; the principal use of this oil is to make Eau de Cologne.

Eau de Cologne is made by mixing oil of neroli fʒss, oil of lemon f℥j, oil of rosemary fʒss, oil of bergamot f℥j, oil of sandal wood fʒss; dissolve in rectified spirit Oij, and add orange flower water f℥viij. Applied on a single fold of thin linen it forms an agreeable evaporating lotion in head-ache.

CITRUS MEDICA. *The Citron.*

Is distinguished by its large fruit, which sometimes weigh above twenty pound; its rind is very thick, and forms the preserved citron of the shops; when distilled it yields an essential oil of cedrat, like lemon. The plant is erroneously assigned by E. as the source of the latter fruit.

CITRUS BERGAMIUM, L. CITRUS LIMETTA, E.

The Bergamot.

Leaves oblong, elongated, acute; flowers white and small; fruit pear shaped; its rind pale yellow, with concave oil vesicles, pulp more or less acid.

It is cultivated in Southern Europe, near Nice; the rind, when expressed or distilled, yields volatile oil of bergamot, of dens. ·88, composed of $C_{10}H_8$, and used only as a perfume; 100 fruits are stated to afford f℥iiss of the oil.

CITRUS LIMONUM, D. L. E. *The Lemon Tree.*

A branched tree, ten to fifteen feet high, with stiff thorns; leaves oval or oblong, petiole with a narrow leafy border, flowers white, tinged with red.

It grows wild in India, and is cultivated in the Azores and South of Europe, whence its fruit is imported, rolled separately in paper, and packed in boxes. When lemon peel is dried, it looses much of its agreeable, aromatic odour, and bitter taste, therefore the fresh rind is preferable for medical use; it yields its properties to both boiling water and to spirit.

Tinctura Limonis, D. *Tincture of Lemon Peel.*

Preparation.—Fresh lemon peel, cut thin, ℥v, proof spirit Oj; macerate for fourteen days, express and filter.

Used as a flavouring addition to mixtures, &c.; it forms an agreeable tincture, lately introduced into the Ph. D. *Dose.*—fʒss to fʒij.

Oleum Limonis.—The oil of lemon is procured by distilling or expressing the finely grated rind; when pure it is colourless, but often has a yellow hue, its dens. is ·84; it consists of two oils, termed citrelene and citrene, the latter of which forms a crystalline compound with muriatic acid; its ultimate composition is $C_{10}H_8$, being similar to turpentine, bergamot, copiaba, &c. This oil is often adulterated with spirit of turpentine, the fraud is difficult of detection except by its smell. A mixture of two parts of turpentine and one of oil of lemon is sold under the name of *scouring drops* to remove grease spots; medically the oil is little used except to flavour ointments, and it has been dropped into the eye in those ophthalmic affections for which wine of opium is prescribed.

Succus Limonis.—Lemon juice is obtained by expressing the pulp, a turbid liquid flows out, which on resting, deposits much fecula; the juice is then filtered, but from the mucilage and extractive it contains, it readily decomposes. The navy obtain it from Sicily, mixed with a tenth part of strong brandy to preserve it; and it may be kept for some time in vessels perfectly filled and corked, or covered with a thin layer of fine almond oil. Lemon juice contains 1·7 parts of citric acid dissolved in 100 of water, with malic acid, gum, and extractive matter.

USES.—Its great value is as a remedy for scurvy, which it shares with all fresh vegetables, and it appears as if the deprivation of a due supply of raw vegetable food was the source of these affections, and its restoration their proper cure, independent of any other medical treatment. It was proposed to substitute a solution of citric acid in water for lemon juice from the difficulty of preserving the latter, but this is very inferior to the juice or the fresh fruit. The employment of fresh vegetables should also be attended to in purpura hemorrhagica, which is often closely allied to scurvy, and one of the worse cases of purpura that I can remember, treated with lemons and other vegetables alone, made a rapid and perfect recovery. In forming effervescing draughts with bicarbonate of potash, fresh lemon juice is preferable to citric acid; they allay febrile thirst, act as a mild and useful diaphoretic, and are prescribed to check nausea and vomiting; the other alkalies, soda, and ammonia, are also occasionally given in effervescence. Diluted with water and sweetened, or added to rice, or barley water, lemon juice forms lemonade, a refreshing drink in febrile and inflammatory affections, and in hæmorrhagic attacks, a lump of ice is a useful addition to it.

Artificial Lemon Juice.—Sugar ʒvi, mix with oil of lemon gtt v; add citric acid ʒviiiss, gum ʒij, and dissolve in hot water Oj.

Syrupus Limonum, L. E. *Syrup of Lemon.*

Preparation.—Fresh lemon juice, strained and free from impurities Oj, sugar ℔ijss, dissolve with gentle heat, set it aside for twenty-four hours. and pour off the clear liquor.

Used for flavouring mixtures; if kept, it soon spoils; hence D. directs a syrup of citric acid to be employed in its stead. *Dose.*—fʒj to iv.

ACIDUM CITRICUM, D. L. E. *Citric Acid.*

Discovered by Scheele in 1781; it is contained in many fruits, either free or united to lime or potash; in the lemon, cranberry, &c. it has little or no malic acid with it; in the gooseberry, strawberry, and raspberry it exists mixed with an equal amount of this acid. Citric acid forms colorless, right rhombic prisms, terminating in four trapezoidal facets; if crystallized by slow cooling, it consists of $C_{12}H_5O_{11},3HO+2Aq$, though when deposited from a hot solution, its crystals are different, and want the 2 Aquæ, (Kane,) it tastes agreeably acid, has no odour, and is soluble in less than its own weight of cold water; this acid is tribasic; when heated, it undergoes several chemical changes, and is finally decomposed.

Preparation.—D. In the materia medica, to be bought prepared.

L. Heat lemon juice Oiv, and gradually add prepared chalk ℥ivss; set it by that the powder may subside, and pour off the supernatant liquid; wash the citrate of lime frequently with warm water, then pour on it dilute sulphuric acid f℥xxviiss, mixed with distilled water Oij, and boil for a quarter of an hour; strain the liquor with strong pressure through linen, evaporate it with a gentle heat, and set it by that crystals may form; dissolve the crystals, strain, and evaporate them twice more, that they may be pure.

E. Uses the same quantity of lemon juice and chalk, or a sufficiency of it, and dilute sulphuric acid f℥xxxvj. The juice is directed to be twice boiled before the chalk is added, and it is recommended to clarify the juice with albumen as serviceable for the purification of the citric acid; after the sulphuric acid is added, the filtered liquid should be tested with nitrate of barytes, and if the precipitate thus obtained is not all soluble in nitric acid, more citrate of lime must be added to saturate the excess of sulphuric acid.

In this process, an insoluble citrate of lime is formed by the lemon juice and chalk, carbonic acid escaping; the citrate is then washed free from mucilage and other impurities, and decomposed by sulphuric acid; sulphate of lime deposits, and citric acid is set free and procured in brownish crystals, which are got colorless by recrystallizing.

TESTS.—It does not precipitate with lime water until heated, when a white powder falls; and with potash, it forms a very soluble salt; these tests distinguish it from tartaric acid.

ADULTERATIONS.—Any fixed impurity as lime, will remain on strongly heating citric acid with a little red oxide of mercury; and tartaric acid may be detected, if present, by forming a white deposit of cream of tartar with carbonate of potash.

USES.—When lemon juice cannot be obtained, citric acid may be substituted for it in making effervescing draughts, but as an antiscorbutic, the fresh juice is far preferable. It is used in the—

Syrupus Acidi Citrici, D. *Syrup of Citric Acid.*

Preparation.—Citric acid in powder ℥iiss, dissolve by heat in distilled water ℥iiss, and add it with tincture of lemon peel f℥v, to simple syrup Oiij; mix.

Directed as a substitute for syrup of lemons, to which it is preferable in cheapness, easy preparation, and diminished liability of changing, but it is inferior in flavor. *Dose.*—f℥j to iv added to mixtures.

GUTTIFERÆ. *The Mangosteen Tribe.*—Trees, rarely shrubs, and sometimes parasitic climbers, with yellow resinous juice; leaves coriaceous, opposite, without stipules; flowers perfect or polygamous; sepals two to six, persistent; petals four to ten; stamens numerous hypogynous; ovary one or many celled, ovules, one erect, or many with a central placenta; fruit a capsule or berry, embryo strait, without albumen.

HEBRADENDRON GAMBOGIOIDES, D. L. E.

The Gamboge Tree.

A tree with entire leaves, and unisexual flowers; male, having four yellow sepals, four petals, and monadelphous stamens in a quadrangular column; female unknown; berry with a sweet pulp, the size of a cherry, four celled, each with one large seed.

Gamboge was brought from China in 1603, by the Dutch; two varieties of it are now met in commerce, distinguished as Siam and Ceylon, from the countries whence they are imported. Siam gamboge, which is employed in this country, is derived from a tree unknown to botanists, though probably similar to the plant above described; it is obtained by breaking the twigs and young shoots, collecting the juice that exudes in a cocoa-nut, and allowing it to harden; a finer kind is received in the hollow of bamboos, and afterwards imported in distinct masses, which are sometimes hollow, and are striated from the bamboo externally, or the masses may cohere together. In Ceylon, the tree described above, grows in abundance, and yields a gamboge that is rarely imported; it is collected by cutting off pieces of the bark in the morning, the semi-fluid juice that exudes thickens, and is scraped off next day, and dried in flattened, roundish masses, weighing about one pound each; they are coarse, and composed of irregular, dull coloured fragments, adhering together, with cavities between them. Gamboge in bamboos is usually of fine quality, its colour is a rich, reddish yellow, becoming darker by exposure to light; it is odourless, and with little taste, but afterwards causes some acridity of the throat; its powder is bright yellow, and when pulverized its dust irritates the nose; it ought to break easily, with a smooth surface. Lump gamboge is in masses, usually of inferior quality and dull colour, with fragments of wood and air cells through it, and containing starch. According to Christison, this gum resin yields—

Siam Pipe Gamboge,	Resin	77·2,	Arabin	23·0,	Moisture	4·8.		
Siam Cake Gamboge,	„	64·1,	„	20·2,	„	4·1,	Lignin 5·3,	Fecula 5·6.
Ceylon Gamboge,	„	75·5,	„	18·3,	„	4·8,	Cerasin 0·7.	

The resin, termed gambogic acid, is extracted by ether, and left on evaporation in thin orange coloured layers; it will tinge 10,000 times its weight of spirit; with acetate of lead it produces a yellow precipitate, and with iron salts a dark brown; the presence of gamboge in pills may be detected by forming an etherial tincture, and applying those tests.

ADULTERATIONS.—Wood and stones can be seen; and starch is easily discovered by iodine, which renders the yellow solution of gamboge green.

USES.—In small doses, it causes purging of liquid evacuations; in greater quantity, nausea, griping, watery discharges, and diuresis; while excessive doses, or smaller repeated ones, produce over-purging, followed by debility and such exhaustion as may prove fatal. It is used in constipation, combined with other cathartics, and being a hydragogue, and somewhat diuretic, it is given in dropsies when purging is desirable; for this purpose it is often added to diuretics, and has been prescribed in an emulsion with carbonate of potash, termed tincture of gamboge; this drug is considered most useful in dropsies depending on hepatic obstruction; for when the kidneys are diseased, causing anasarca, the bowels are too easily irritated, and I have seen patients in whom, when purging set in, it continued unchecked after every trace of dropsy was removed, and they sank rapidly from exhaustion. From its cathartic action it is often added to vermifuges, but it does not seem to have any special action over worms.

DOSE.—Gr. j to iv every four or six hours; ʒj has proved fatal, by causing vomiting, purging, and syncope.

Pilulæ Gambogiæ Compositæ, L. *Pilulæ Gambogiæ*, E.
Gamboge Pill.

Preparation.—L. Gamboge powdered ʒj, aloes ʒiss, ginger ʒss, castile soap ʒij; mix.

E. Gamboge, East Indian or Barbadoes aloes, of each in powder, one part, aromatic powder one part, castile soap two parts; mix and beat into a mass with syrup.

Uses.—Cathartic, in doses of gr. v to gr. xv.

Tincture of Gamboge, Voigtel. Gamboge in powder ℥ss, carbonate of potash ℥j; mix and add brandy f℥xij, digest for four days with gentle heat. *Dose.*—fʒss to fʒj.

CANELLA ALBA, D. L. E. *Canella.*

A tree with whitish bark, leaves usually alternate, the older ones smooth, dotted when young; flowers small, clustered, purple, sepals five, petals five, stamens in a tube; berry three-celled, by abortion one-celled, cells one to three seeded.

White canella or wild cinnamon, is a common tree in the West Indies and in South America; on the shore its height varies from twelve to fifteen feet, but inland it is often fifty feet high. Its bark is removed by iron instruments, freed from its epiderm and dried; it is imported in flat or quilled brittle pieces, of white or light buff colour, aromatic odour, and a pungent, spicy taste; it contains a fragrant volatile oil, resin, bitter extractive, and a crystalline substance termed canellin, which resembles mannite; it has no tannin, which distinguishes it from Winters' bark, with which it is sometimes confounded. Canella is an aromatic tonic, rarely employed, except with other remedies; in the West Indies it is used as a spice.

VITACEÆ. *The Vine Tribe.*—Climbing shrubs with tumid joints; leaves stipulate; flowers small, green; calyx small, nearly entire; petals valvate in æstivation; stamens opposite the petals, inserted on the disk; ovary two-celled, ovules erect; berry pulpy, embryo small, with hard albumen.

VITIS VINIFERA, D. L. E. *The Vine.*

A hardy shrub of variable size; leaves lobed, flowers in racemes, fruit the grape; many varieties are cultivated.

The unripe berries are acid, their expressed juice (verjuice) yields about 1·12 per cent of tartaric acid, with 2·2 of malic acid and bitartrate of potash; as they ripen, these acids form grape sugar or glucose, $C_5H_7O_7$, which is less sweet and less soluble than cane sugar; grape juice also contains gum, glutinous matter, colouring, and cream of tartar, which is deposited in masses termed argol, as the juice ferments and is converted into wine.

Uvæ Passæ, raisins are procured by drying grapes in the sun or by the heat of ovens; they are used to flavour some preparations, as compound tincture of senna, and decoction of barley, but have no medical properties.

Vinum, *Wine;* in the pharmacopæias, sherry is alone employed, although many other wines are made use of in medicine. They are prepared from the expressed grape juice; this cannot ferment in the grape, as its husk excludes oxygen, which is necessary for the process, the juice or must, however, readily undergoes fermentation; at a temperature from 60° to 80° it becomes muddy and warm, evolving carbonic acid; when this ceases, the opaque parts subside, the liquid clears, and is found to have become vinous, having lost its sweet taste; it is then removed into casks, further fermented, fined or clarified, and rendered fit for use. The peculiar odour of wine depends upon a volatile oil, and according to Liebig, on œnanthic ether developed in the process; locality, the colour and kind of grape, and other circumstances, contribute to produce its numerous varieties; the quantity of alcohol they contain is very variable, nor is it yet established that it bears a direct ratio to the intoxicating powers of the wine.

USES.—Sherry is employed to form medicated tinctures; port wine from its astringency is usually preferred for internal use, particularly when there is any tendency to diarrhœa, and a mixture of it with an equal quantity of water is used as an injection for the radical cure of hydrocle; Madeira and claret are both acid wines, the latter is useful when a slight stimulant is required, and stronger wines might be injurious; Madeira is stronger than sherry, and is prescribed in broken down constitutions and for old persons.

The medical uses of wine are too numerous and important to be fully entered on; in fevers, it is often a chief means of treatment, though it is less used now than formerly, and in smaller quantity; it appears indicated whenever the circulation is languid, denoted by a weak pulse, and the livid patches produced on the depending parts of the body by congestion, or in typhus, when the eruption becomes dark coloured from the same cause. Dr. Stokes regards the heart as affording a better indication for its employment than the pulse, its diminished impulse and the feebleness or extinction of its first sound, being a direct evidence for the use of wine in fever; if during its employment, dryness of the tongue, quick pulse, restlessness, or delirium should arise, it ought to be discontinued; but a dry tongue or delirium are no reasons why it should not be given if the circulation is failing and requires to be stimulated. During convalescence from disease, in chronic debilitating affections with excessive discharge, and for erysipelas, and gangrene not attended with high inflammation, wine is constantly employed; each case, however, requires distinct rules for its exhibition.

ACIDUM TARTARICUM, D. L. E. *Tartaric Acid.*

Was discovered by Scheele in 1770; it is found in vegetables, in which it exists in a free state, or more usually combined with potash, forming cream of tartar, or as a tartrate of lime; in commerce it is obtained from the bitartrate of potash, which is deposited during the fermentation of wine. It consists of $C_8H_4O_{10}+2Aq$, and crystallizes in oblique rhombic prisms of a strong acid taste, colourless, and soluble in cold water, or in half its weight of boiling water; it also dissolves in alcohol; its watery solution if long kept, produces a soft pulpy mass of a low form of vegetable organization; when tartaric acid is heated, it fuses, undergoes several changes, and is finally decomposed; it is a bibasic acid.

Preparation.—L. E. Boil bitartrate of potash ℔iv, in distilled water cong. ij, add gradually to it prepared chalk ℥xij ʒvij, and when effervescence ceases, add as much more chalk, previously dissolved in hydrochloric acid f℥xxviss, and water Oiv: set it aside that the tartrate of lime may subside, pour off the liquor, and wash the tartrate of lime frequently in distilled water until it is tasteless, then pour on it dilute sulphuric acid Ovij ℥xvij, and boil for a quarter of an hour; evaporate the strained liquor by gentle heat, and crystallize; the crystals are purified by dissolving them in water, and re-crystallizing three times.

D. In the materia medica, to be bought prepared.

In this process, carbonate of lime (prepared chalk) combining with the second atom of tartaric acid of the cream of tartar, forms a tartrate of lime which precipitates, while carbonic acid escapes in effervescence, and a neutral tartrate of potash remains dissolved. KO,2 Tart, and $CaO\ CO_2 = CO_2$; CaO Tart, and KO, Tart; to decompose the latter, chloride of calcium is formed and added to the solution, it produces a soluble chloride of calcium, and another quantity of insoluble tartrate of lime. KO, Tart $+$CaCl$=$KCl and CaO, Tart. The two portions of tartrate of lime are washed and decomposed by sulphuric acid, which makes an insoluble sulphate of lime, while tartaric acid is set free, and got by evaporation in crystals, 2,CaO, Tart $+2,SO_3 = CaO,SO_3$ and 2, Tart Acid.

TESTS.—With salts of potash, as the acetate, an excess of tartaric acid produces a white precipitate of cream of tartar.

ADULTERATIONS.—Cream of tartar is sometimes mixed with it; this is detected by strongly heating the suspected salt, when some carbonate of potash will remain if it is impure.

USES.—It is largely employed as the acid for soda and seidlitz powders, and to form acidulous or effervescing drinks for febrile and inflammatory affections.

Trochisci Acidi Tartarici, E. *Acidulated Lozenges.*

Preparation.—Tartaric acid ʒij, pure sugar ℥viij; mix, and add oil of lemon ten minims, and with mucilage form it into a mass for making lozenges.

Used in bronchitis and recent cough; they are better got as confectionary.

OXALIDEÆ. *The Wood Sorrel Tribe.*—Herbs or shrubs, rarely trees; leaves alternate, compound and often sensitive; sepals and petals, each five, stamens ten, more or less monadelphous, styles five, fruit membranous, capsular, five-celled, seeds few, often with a fleshy integument, which expels the mature seed with elasticity; albumen fleshy.

OXALIS ACETOSELLA, L. *Wood Sorrel.*

A small perennial, with creeping root stock; leaves composed of three bright green, heart-shaped leaflets, which droop at night, and arise from a purple slender stalk; flowers drooping, white, with purple veins, stem single-flowered.

This plant is considered to be the true shamrock; it is odourless, and tastes agreeably acid from containing about one per cent of binoxalate of potash; sorrel is seldom employed in medicine; during the late epidemic of cholera it was used by the lower orders in this country as a specific, boiled with milk; it caused aggravation of the symptoms, and often did great harm.

Sal Acetosellæ, or binoxalate of potash, may be got by evaporating the juice of the plant; in commerce, the quadroxalate of potash is sold instead of it; this is made by saturating oxalic acid with potash, and adding to the solution three parts more of the acid. It is used under the name of salt of lemons, to remove iron stains from linen, and decolorize straw for bonnet making; a weak solution is sometimes given to allay febrile thirst, but in large doses, it is nearly as poisonous as oxalic acid itself; thus ʒss killed a lady in eight minutes, causing violent pain in the abdomen and convulsions.

ACIDUM OXALICUM. (C_2O_3+3Aq.) *Oxalic Acid.*

This acid is found in several plants combined with lime or potash, some lichens yielding nearly half their weight of the oxalate of lime; a similar compound is frequently present in the urine, and by cohering, constitutes the mulberry calculus. Oxalic acid forms colourless, oblique rhombic prisms, which are usually six-sided, and have dihedral summits; it is strongly acid, and without odour; in dry air it looses two equivalents of water, leaving a white hydrate of oxalic acid; at 350° this fuses and sublimes, being partly decomposed; it melts in eight parts of cold, or one of hot water, or in four times its weight of alcohol.

Preparation.—Digest one part of sugar, or potato starch, with four parts of nitric acid, of dens. 1·40, with gentle heat, in earthenware vessels; the vegetable matter oxidizes, nitrous fumes escaping, and when this action diminishes, another part of nitric acid is added and the heat increased; by evaporation, crystals are obtained and purified by re-crystallizing.

Its formation is theoretically explained by considering the hydrogen of sugar to be combined with oxygen derived from the nitric acid, and converted into water, while more oxygen is substituted instead of the hydrogen thus removed. $C_{12}H_9O_9$, dry sugar, and $6NO_5 = 6,C_2O_3$ oxalic acid, $9HO$, and $6NO_2$. In practice the reaction is more complex, as carbonic, saccharic, and some acetic acids form.

TESTS.—Its strong acidity; when heated it totally disappears, leaving no residue; with lime water it forms a white deposit, insoluble in excess of the acid; and with nitrate of silver, it produces a white precipitate, which, if dried and heated, feebly detonates.

ADULTERATION.—It often contains traces of nitric acid, which give it a weak nitrous odour; this is removed by exposure to the air.

USES.—On the continent it is employed as a lemonade, and for a refrigerant, in inflammatory diseases of the mucous membranes, especially of the stomach. In doses of ℥ss, or upwards, it is highly poisonous, and less would probably prove fatal; when a concentrated solution, or large quantity of it is taken, it causes an acrid burning taste, soon followed by vomiting of brownish fluid, consisting of blood and altered mucus; the patient has pain in the stomach, clammy sweats, convulsions, and sometimes falls into a state of collapse: death has occured within an hour, but is often more protracted, and even days may elapse, and a fatal termination may then ensue from secondary irritation and exhaustion; when examined the mucous membrane of the stomach is white, brittle, and softened, though rarely perforated; these changes are due to the acid dissolving gelatine from the tissue. In some instances oxalic acid has killed within two or three minutes, from arresting the circulation by affecting the blood, or from some powerful nervous impression; hence, oxalic acid is not so much a corrosive as a constitutional poison.

This acid is occasionally taken in mistake for Epsom salts; its strongly acid taste at once distinguishes it from sulphate of magnesia, which is nauseous and bitter; oxalic acid may be further known by the chemical tests given above, and by reddening common writing ink, which is unchanged by Epsom salts.

ANTIDOTES.—Magnesia, or chalk, mixed with water, should be given at once, and vomiting afterwards produced by emetics, or the careful use of the stomach pump. Alkalies, as potash or soda, are to be avoided, as they form soluble compounds nearly as poisonous as the oxalic acid.

DOSE.—Gr. xij may be taken dissolved in Oj of water, during the day.

ZYGOPHYLLACEÆ. *The Bean Caper Tribe.*—Herbs or trees; branches often articulated at the points; leaves opposite, stipulate, without dots; calyx convolute, sepals five; petals five, clawed, stamens ten; ovary four or five-celled; fruit, capsular or fleshy, with angular wings; seeds few, radicle superior, albumen whitish.

GUAIACUM OFFICINALE, D. L. E. *Guaiacum.*

An evergreen tree, 30 to 50 feet high, stem crooked, wood hard, heavy, and remarkable for the direction of its fibres, each layer crossing the other diagonally; leaves evergreen, bijugate; flowers eight to ten, from the axils of the upper leaves, each on a long single-flowered stem, sepals five, oval, petals five, pale blue, fruit a fleshy yellow capsule.

It is a native of the West Indies, particularly St. Domingo, and the south side of Jamaica, flowering in April. It was introduced into Europe by the Spaniards, in 1508, as a syphilitic remedy; the wood and resin are employed, and on the continent the bark is also used.

Lignum Guaiaci. D. L. E. Guaiac wood, or lignum vitæ, is employed for making rulers, pestles, &c., ; it is imported in large logs; its dens. is 1·33, hence it sinks in water; the alburnum or sap-wood is pale yellow, the heart-wood or duramen, has a greenish brown hue, is hard and tough, and contains much resin. For medical use it is rasped or turned into coarse powder, which may be adulterated with other kinds of sawdust; with nitric acid the genuine wood may be distinguished by being coloured of a temporary blueish green. Guaiacum has no smell until heated; its taste is slightly bitter and acrid, affecting the throat; it contains resin 26·, acrid extract ·8, coloring, woody fibre, &c. 73· in 100 parts. Its bark is grey, very hard, and contains much more acrid extract than the wood.

Resina Guaiaci, D. L. E. Guaiac resin, usually called guaiacum, is in large lumps or semi-transparent pieces, covered with a grey dust, and mixed with bark and bits of wood, &c.; it is of a brownish green colour, and in thin fragments nearly translucent and yellowish green; when freshly broken it resembles common resin; if masticated it softens a little, has only a slight taste, but produces acridity in the throat; when melted it exhales an agreeable odour; its dens. is 1·29; in consists, in 100 parts, of guaiacic acid 91 parts, and 9 of a brown acrid extract, soluble in water; in powder it is greyish, becoming green when exposed to the light, probably from the guaiacic acid absorbing oxygen; this acid is dissolved by alcohol, and is distinguished by becoming blue when mixed with gluten, or gum arabic; and with nitric acid, it is coloured green, then blue, and finally brown.

ADULTERATIONS.—Common resin is occasionally found in it; this may be detected by adding a spirituous tincture of the guaiacum to water, with an excess of caustic potash, it remains clear if pure, but becomes milky when resin is present.

USES.—The wood, boiled in water, gives an acrid yellow decoction, which is slightly diaphoretic if taken warm; its uses are similar to the resin, which is more acrid and stimulating; they are both employed in chronic rheumatism, occurring in weak and aged persons, in these with syphilitic or scrofulous taint, and for skin diseases of long duration. In low gouty affections it is sometimes useful; and for syphilis it was formerly considered almost specific; it is now little relied on, perhaps from our having more active remedies, and also exhibiting the guaiacum in an improper manner; it should be given while the patient is confined to bed, and its sudorific action promoted by warmth.

Mistura Guaiaci, L. E. *Guaiacum Mixture.*

Preparation.—Rub Guaiac resin ʒiij, with sugar ℥ss, add mucilage f℥ss, and gradually mix with cinnamon water f℥xix. (f℥xixss. E.)

Dose.—fʒss to f℥ij, twice or thrice in the day, in chronic or subacute rheumatism, and cutaneous diseases.

Tinctura Guaiaci, D. L. E. *Tincture of Guaiacum.*

Preparation.—Guaiac resin in fine powder ℥vij, (℥viij, D.,) rectified spirit Oij, digest for fourteen days and filter, (seven days, E.)

Dose.—fʒj to iij; when added to water the resin is precipitated, hence it should be suspended by mucilage or milk; it is much employed.

Tinctura Guaiaci Ammoniata, E. *Tinctura Guaiaci Composita*, L. *Ammoniated Tincture of Guaiacum.*

Preparation.—L. Guaiac resin in coarse powder ℥vij, aromatic spirit of ammonia Oij, digest for fourteen days, and filter.

E. Guaiacum ℥vij, spirit of ammonia Oij, digest for seven days, and filter.

Dose.—fʒss to fʒij; from containing ammonia it is more stimulant and sudorific than the simple tincture; it should be given in some mucilaginous emulsion.

Decoctum Guaiaci, E. *Decoction of Guaiacum.*

Preparation.—Guaiacum turnings ʒiij, raisins ℥ij, boil gently with water Oviij, until reduced to Ov, adding towards the end, liquorice root bruised ℥j, sassafras rasped ℥j, and strain the decoction.

This was known as decoction of the woods formerly; its active part is the extractive matter of the guaiacum, as water can dissolve little of the resin; the sassafras gives it flavour without adding much medical properties. It acts as a mild diaphoretic, and a vehicle for other remedies in chronic rheumatic and syphilitic diseases. *Dose*, f℥ij to iv.

RUTACEÆ. *The Rue Tribe.*—Shrubs or herbs, leaves dotted, without stipules; sepals free; petals free, twice as many as the sepals, sometimes united; stamens definite, on the outside of a cup-like disk; ovary few-celled, ovules two to four, style single, sometimes divided near the base, fruit capsular, separating into carpels when ripe; radicle superior.

RUTA GRAVEOLENS, L. E. *Rue.*

A branching shrub, leaves blueish-green, leaflets thickish, tapering towards the base; flowers yellow, in a terminal corymb, the flower that first opens has usually five sepals and petals and ten stamens, the others four petals and sepals, and eight stamens; the anthers move in turns to the pistil and having shed their pollen, retire; fruit roundish, warty, four-lobed, each lobe opening into two valves.

Rue has a strong unpleasant odour, and nauseous taste; the leaves are used, and E. directs the unripe fruit as well, which is covered with oil vesicles; when dried its taste and smell are both impaired; its effects depend on essential oil and a very bitter extractive.

USES.—The fresh plant is acrid, and handling it has caused vesications; it has long been given as an emenagogue, and is yet employed in France, among the lower orders, to induce premature labour. From some instances that are related it appears to act as a narcotico-irritant, causing gastric pain, giddiness, tottering, attempts at vomiting, slow pulse, and after some days, abortion. In medicine it is prescribed in the flatulent colic of children, and some forms of convulsions arising from flatus or intestinal irritation, in the form of enemas, containing the confection or the essential oil; rue is also administered for hysteria and amenorrœha, and for worms it is sometimes added to other vermifuge drugs; when these parasites are the cause of epilepsy, or when it depends on uterine affections, rue may be of benefit in preventing the recurrence of the fits.

DOSE—℈i to ʒss of the powder; it is rarely employed.

Confectio Rutæ, L. *Confection of Rue.*

Preparation.—Rue dried, carraways, bay berries, of each ℥iss, sagapenum ℥ss, black pepper ʒij, rub into fine powder and mix. When used, add honey ℥xvj.

Dose.—℈j to ʒj, administered in enemas of gruel for flatulent colic and convulsions of children.

Oleum Rutæ. E. *Oil of Rue.*—Got by distilling the leaves with water; it is yellow, of strong odour and bitter, acrid taste, dens. ·911, twelve pounds of the leaves yield fʒiij of the oil; the same quantity, with the nearly ripe capsules, give above f℥j. It is given internally in doses of gtt ij to v made into an emulsion, or in smaller doses in pills; externally it is used as a stimulant in palsy.

Syrup of Rue.—Is made by dissolving gtt x of the oil in simple syrup Oj.

Dose.—fʒj to ij, for children.

BAROSMA CRENATA, D. L. E. *Buchu.*

Several shrubs yield Buchu, E. They have opposite, smooth, dotted leaves: flowers axillary and stalked; calyx five cleft; disk lining the bottom of the calyx with a very slight rim: petals five; stamens ten, half of them fertile, the others like petals; fruit composed of five cocci, with glandular dots at the back. Among the species are:—

Barosma Crenata—leaves ovate and oblong acute, serrated, glandular at the margin, flowers pink and solitary.

Barosma Crenatula.—leaves ovate oblong, very obtuse, minutely crenated, smooth and dark green above, paler below, and dotted with oil glands; at each serration is a conspicuous oil gland, and a pellucid margin round the whole leaf, flowers blueish.

Barosma Serratifolia—leaves linear lanceolate, smooth, glandular, three-nerved; flowers white.

The leaves are imported from the Cape of Good Hope; they were introduced into practice in 1823, and their properties investigated by the late Dr. M'Dowel and others; previous to this, the Hottentots employed them in chronic diseases of the stomach and bladder. They are smooth and hard, resembling senna, from which they are distinguished by their serrated edges, their strong peculiar odour, like rue and mint, and by being studded with oil glands; they taste warm and aromatic. When buchu is analysed, it yields a yellowish volatile oil, on which its smell and much of its activity depends, with bitter extract or diosmin, gum resin, woody fibre, &c.

USES.—It acts as a stimulant, and perhaps as a direct but slight tonic to the kidneys and urinary passages, hence it employed in chronic diseases of the bladder, with excessive mucous discharge, and Dr. Prout considers it to be one of the most efficacious of the balsamic remedies, while it is also mild in its effects. It causes increased secretion of urine, to which it imparts an odour soon after it is taken; cubebs, copaiba, and similar medicines may be added to it in small doses; in diseased prostate, irritable bladder, and in spasmodic stricture, it may be given with success, but only for such cases as are benefitted by slight stimulation; in chronic cutaneous and rheumatic affections it has been prescribed with occasional success, as it has some slight diaphoretic effects.

DOSE.—Of the powder ℈j to ʒss, rarely prescribed.

Infusum Buchu, D. *Infusum Diosmeæ*, L. *Infusum Bucku*, E.
Infusion of Buchu.

Preparation.—D. Buchu leaves bruised ℥ss, boiling water Oss, infuse for one hour in a covered vessel, and strain.

L. E. Buchu ℥j, boiling water Oj, macerate for four hours and strain, (macerate for two hours, and strain through linen or calico, E.)

Dose.—f℥j to ij.

Tinctura Buchu, D. *Tinctura Bucku*, E. *Tincture of Buchu.*

Preparation.—Buchu leaves bruised ʒv, proof spirit Oij, macerate for fourteen days, strain, express and filter; (macerate for seven days and filter; it may also be made by percolation, E.)

Dose.—fʒj to iij, added to the infusion.

GALIPEA OFFICINALIS, E. G: CUSPARIA, L.

Angostura or Cusparia.

Shrubs or trees, leaves simple or ternate; calyx five-toothed; petals five, stamens four to seven, of which two to four are abortive; ovaries five, connected, one-celled; capsules by abortion, one or two.

Galipea Cusparia, is a forest tree, sixty feet high; leaflets sessile, ovate acute, with flowers in axillary racemes, almost terminal, white, with fascicles of hair seated on glandular bodies on the outside; stamens six, two fertile; seed solitary. It grows in South America, between Cumana and New Barcelona, and yields angostura bark, according to Humboldt.

Galipea Officinalis, is twelve to twenty feet high; leaves trifoliate, having the odour of tobacco when fresh, leaflets six to ten inches long; flowers white, hairy, in racemes; stamens seven, two fertile; seeds two in each capsule, one usually abortive. It grows about the Orinoco, and yields angostura bark, according to Hancock.

This bark was brought to England in 1788, from Angostura in South America, and from specimens sent home by Humboldt and Bonpland, of the Galipea cusparia which they considered its source, the tree was named Bonplandia trifoliata; but Dr. Hancock, in 1816, resided in the district where it is procured, and asserts that it is derived from the G: officinalis. Cusparia bark is in flat or quilled pieces, four to ten inches long, and one or two lines thick, having a grey or yellowish white epiderm, easily scraped off; the bark is brittle, compact, with a short resinous fracture, inside it is yellowish brown and splintery, its odour is peculiar, its taste bitter, slightly acrid and aromatic; it contains a volatile odorous oil, resin, gum, and a bitter neutral principle termed angosturin, which crystallizes from the alcoholic tincture when evaporated.

ADULTERATIONS.—In 1804, it was noticed on the continent, that a bark said to be angostura, and brought from the East Indies, acted as a poison; its use was therefore prohibited over the greater part of Europe; this appears to have happened from the mixture of some unsaleable eastern bark with genuine angostura, and was attributed to the *Brucea anti-dysenterica* of Abyssinia, but it was more probably the bark of some strychnos; since then, angostura is rarely prescribed. The false bark is thick, heavy, hard, very bitter, and its edge becomes red with nitric acid, while the same acid changes its epiderm to a dark green, or black colour.

USES.—It is tonic from its bitterness, and aromatic as it contains essential oil and resin; in South America, it is employed in bilious remittent and intermittent fevers, many considering it superior to cinchona; it has no astringency, and therefore does not confine the bowels; in full doses it both nauseates and purges. Its preparations may be prescribed in any of those affections for which tonics are exhibited.

DOSE.—Gr. x to xxx of the powder, rarely used.

Infusum Cuspariæ, L. E. *Infusion of Cusparia.*

Preparation.—Cusparia bruised ʒv, boiling water Oj, macerate for two hours and strain, (through linen or calico, E.)

Dose.—f℥j to ij twice or thrice daily.

Tinctura Cuspariæ, E. *Tincture of Cusparia.*

Preparation.—Cusparia in moderately fine powder ℥ivss, proof spirit Oij, make it as tincture of cinchona, or more expeditiously by percolation.

Dose.—f℥j to ij added to the infusion.

SIMARUBACEÆ. *The Quassias.*—Trees or shrubs, with very bitter wood, leaves alternate without stipules or dots: flowers complete or unisexual: sepals four or five; petals longer, deciduous, æstivation twisted: stamens arise from a hypogynous scale; ovaries on a stalk, four or five lobed, each with one suspended ovule; fruit indehiscent, embryo without albumen.

PICRÆNA EXCELSA, D. E. QUASSIA EXCELSA, L.

Quassia.

A tree 50 to 100 feet high, with smooth, dark grey bark; leaves pinnate, leaflets four to eight pair stalked, oblong acuminate; raceme spreading, axillary; flowers small, yellowish green, polygamous; drupes three, one alone ripening into a black shining nut, like a pea.

Quassia wood was introduced in 1742, it was produced by the Quassia amara of Surinam, but the tree being small and not common, the wood of the Picræna excelsa is used in its stead. This is imported from Jamaica in logs covered with a dark grey bark; the wood is white, becoming pale yellow by exposure to light, it is odourless and intensely bitter; for use it is chipped or rasped; it contains a bitter crystalline neutral substance termed quassite, which is got by alcohol from a watery extract of the wood; it also yields slight traces of volatile oil, salts, lignin and gum.

Quassia is a pure bitter; with small animals, as flies, it acts like a narcotic poison, it appears not to have any such effect upon man; it is used as a tonic, in particular for dyspepsia in gouty habits, and its infusion is employed as a vehicle for other remedies, as saline cathartics, antacids, and preparations of iron, with the latter it forms a clear solution, as it contains no tannin.

Infusum Quassiæ, D. L. E. *Infusion of Quassia.*

Preparation.—D. Quassia wood rasped ʒj, boiling water f℥viijss, infuse for one hour and strain off f℥viij.

L. Quassia chips ℈ij, boiling water Oj, macerate for two hours and strain.

E. Quassia chips ʒj, boiling water Oj, infuse for two hours, and strain through linen or calico.

Dose.—f℥j to ij, as a tonic.

Tinctura Quassiæ, E. *Tincture of Quassia.*

Preparation.—Quassia chips ʒx, proof spirit Oij, digest for seven days and filter.

Dose.—fʒj to ij added to bitter mixtures.

Tinctura Quassiæ Compositum, E. *Compound Tincture of Quassia.*

Preparation.—Bruised cardamoms ℥ss, bruised cochineal ℥ss, cinnamon in moderately fine powder ʒvj, quassia in chips ʒvj, raisins ℥vij, proof spirit Oij, digest for seven days and strain, strongly express the residue and filter. It may be got by percolation, if the quassia be rasped or in powder.

Dose.—fʒj to iij added to other tonics.

Extractum Quassiæ, E. *Extract of Quassia.*

Preparation.—Make a watery infusion by percolation and without heat, then evaporate it, or prepare like extract of liquorice.

Dose.—Gr. ij to v in pill.

SIMARUBA AMARA, D. E.

SIMARUBA OFFICINALIS, L. *Mountain Damson.*

A tall tree with spreading roots and smooth grey bark, which becomes black and furrowed when old; leaves alternate, leaflets two to seven on each side, alternate, firm and mucronate; flowers unisexual, white, mixed in panicles, calyx five toothed, petals five, spreading; male stamens ten; female with ten rudimentary stamens, around five ovaries; fruit, five ovate black capsules on a fleshy disk.

The root-bark was sent to Paris in 1713, as a remedy for dysentery, from Guiana, it is also got from Jamaica in long fibrous pieces, folded into flat bundles, with a rough greyish epiderm, the bark is darker, odourless and bitter; it contains a substance like quassite, resin, volatile oil, salts, mucilage and woody fibre. It operates as a bitter tonic, causing vomiting and purging in large doses, and has been found useful in dysentery and chronic diarrhœa, but is seldom prescribed, and should not be given in acute attacks until the inflammatory symptoms have subsided.

Infusum Simarubæ, D. L. E. *Infusion of Simaruba.*

Preparation.—D. Simaruba bark bruised ʒij, boiling water f℥ix, infuse for one hour in a covered vessel and strain off f℥viij.

L. E. Simaruba bark bruised ʒiij, boiling water Oj, macerate for two hours and strain (through linen or calico, E.)

Dose.—f℥j to ij.

EXOGENS. *2nd. Calycifloral*s.

RHAMNACEÆ, *Buckthorns.*—Trees or shrubs; leaves alternate with small stipules; flowers small; calyx valvate, four to five cleft; petals distinct, inserted into the orifice of calyx; stamens four to five, opposite the petals, ovary superior or half superior, each with one erect ovule; fruit a capsule or berry, with little albumen, embryo with large flat cotyledons.

RHAMNUS CATHARTICUS, L. E. *Buckthorn.*

A branching spiny shrub; leaves ovate, toothed; flowers diœcious, males with four stamens and one short style; females, with four projecting stigmas, and rudimentary stamens; fruit black, four celled.

It grows in hedges, flowering in May, and ripening its fruit in September; its pulp is greenish, of bitter nauseous taste, and unpleasant, faint smell. The juice when evaporated to dryness forms sap green; it contains some purgative principle, which is not fully understood, and was formerly used as a cathartic, its effects are violent, attended with nausea, thirst, and severe griping, hence it is seldom employed, though once much esteemed; its only preparation is the syrup.

Syrupus Rhamni, L. E. *Syrup of Buckthorn.*

Preparation.—Fresh buckthorn juice Oiv, set this aside for three days, that impurities may subside. To the clear juice Oj, add ginger sliced ʒvj, allspice bruised ʒvj, macerate for four hours with gentle heat, boil down the rest of the juice to Oiss, mix and add pure sugar ℔iv, and form a syrup.

Dose.—f℥ss to f℥j, added to purgative and sometimes to diuretic mixtures.

ANACARDIEÆ. *The Anacards.*—Trees or shrubs with gummy resinous juice, blackening when dry; leaves alternate, flowers often unisexual, small, greenish; calyx small; petals perigynous, imbricated; stamens usually definite; ovary single one-celled, ovule single, with a funicle from the base of the cell; fruit indehiscing, no albumen.

PISTACHIA TEREBINTHOS, L. E.
Chian Turpentine Tree.

About thirty feet high, leaves pinnate with an odd one, leaflets seven to nine, ovate lanceolate, reddish when young, dark green if old; flowers in a compound raceme; scales of male flower with brown hairs, anthers yellow, stigmas crimson; fruit purple with a one-seeded nut.

The turpentine is got from transverse incisions into its trunk, it runs down on stones where it hardens, each tree yielding about ℥viij or x yearly, and the entire isle of Scio about a thousand pounds weight; it is purified by remelting in the heat of the sun and strained into bottles, its consistence is that of honey, its colour pale greenish yellow, its odour like turpentine, but more aromatic; from its scarcity it is seldom sold, other turpentines being substituted for it. *Uses* similar to oil of turpentine, given in doses of gr. x to xx in pills or emulsion.

PISTACHIA LENTICUS, D. L. E. *Mastic Tree.*

A shrub, leaves pinnate, evergreen, leaflets eight to ten; flowers small, in axillary racemes near the ends of the branches, fruit small, roundish, of brownish red colour.

It grows in the isle of Scio, mastic exudes from incisions made in its bark in August and September, and hardens into tears on the tree or falls upon its stem or on the ground; it is in small transparent drops, dry, brittle, and covered with a light powder from attrition, if chewed it softens, and has an agreeable resinous odour and taste; of 100 parts, about 90 dissolve in alcohol forming a varnish, this portion is mastichic acid, ten parts are insoluble, termed masticine. It is employed in the east as a masticatory; in medicine it is seldom given, it enters into the composition of compound tincture of ammonia, and with thrice its weight of aloes is sometimes prescribed as a dinner pill.

RHUS TOXICODENDRON, L. *Poison Oak or Sumach.*

A shrub, with branching stems; leaves long stalked, trifoliate, irregularly toothed; flowers small, diœcious, in panicles; male, calyx five parted, petals five, stamens five, style rudimentary; female smaller with five abortive stamens, ovary one-celled, drupe round, pale green, with one bony nut, from abortion.

It exudes a milky juice when wounded, which blackens and stains linen indelibly; at night and in shady places, the leaves disengage a gaseous exhalation which is irritant to some persons, causing itching and erysipelatous swelling of the face and hands; no analysis has been yet made of the plant. In small doses, its leaves cause increased diuresis and sweating, and are slightly purgative; in paralysis they are said to produce a return of sensation and motion, with some pain, hence it is given at times in paraphlegia and some forms of amaurosis, but as paralytic affections often depend on organic disease of the nervous centres, constitutional stimulants in such cases must be more likely to do harm than good. For chronic rheumatism and cutaneous eruptions it has also been occasionally used.

DOSE.—Gr. ss to gr. ij, gradually increased until some effect is produced.

BURSERACEÆ. *The Balsam Tribe.*—Trees or shrubs with resinous juice, leaves alternate, sometimes with pellucid dots, and two deciduous stipules; flowers small, regular, or unisexual, calyx of three to five free sepals, petals of equal number, inserted below the disk; stamens six to ten; ovary free, sessile, two to five-celled, ovules in pairs; fruit hard, cells often one-seeded, no albumen, cotyledons plaited and convolute.

BOSWELLIA SERRATA, L. *Olibanum Tree.*

A large branched tree, with leaves crowded at the end of the branches, unequally pinnate, leaflets serrate: flowers in axillary racemes, on short pedicels, bisexual, calyx five toothed, stamens ten, ovary three-celled; fruit capsular, three-angled, seeds solitary.

It grows on hills from Coromandel to the centre of India; its resin, called gum olibanum, is in oval tears, which are pale yellow, semi-opaque and brittle, having an agreeable resinous odour and bitterish taste; Dr. O'Shaughnessy found it to yield fifty-seven of resin, twenty-eight of volatile oil, four of gum, and eleven of gluten, in one hundred parts; when long kept, the quantity of oil is much diminished. It is considered to be the old frankincense, and occasionally employed like other gum-resins as a stimulant to check chronic mucous discharges; I have known it given with benefit in hooping cough.

Dose.—ʒss to ʒj, powdered and made into an emulsion.

AMYRIDACEÆ. *Amyrids.*—Resinous trees or shrubs, leaves compound; flowers axillary and terminal, panicled; calyx four-toothed, persistent; petals four, imbricate; stamens definite, inserted under the annular disk; ovary two-celled; drupe ovate, bony, two-celled, one often abortive, each one-seeded.

BALSAMODENDRON MYRRHA, D. L. E. *Myrrh Tree.*

A shrub, branches spiny, leaves with three obovate, obtuse leaflets; bark pale ash-grey, wood yellowish white, odorous; fruit acuminate, larger than a pea, on a short stalk, and surrounded by a four-toothed calyx.

Myrrh exudes from the bark, like cherry tree gum, and by drying becomes hard and dark coloured; it is imported from Bombay, where it is sent from the Persian and Arabian Gulfs; little of it seems to come from Arabia, and it is probable that Africa, about Abyssinia, is its true source. It is in irregular sized pieces, formed of agglutinated fragments or tears, hard and covered with a fine dust; the best kind, known as Turkey myrrh, from being formerly imported through that country, is in large fragments, its colour varies from pale yellow to reddish brown, it breaks easily, has a resinous semi-transparent appearance, and is often streaked with opaque striæ, its odour is fragrant, and usually considered agreeable, its taste is bitter and aromatic.

A second rate myrrh is brought in chests from the East Indies, consisting of small grains or tears, varying in colour from pale yellow to dark brown, and often mixed with other resinous gums and fragments of gum arabic; many consider it a variety of fine myrrh, but Pereira is of opinion that it is a distinct kind. A third species is in darker pieces and more moist than myrrh, softening when heated, and not brittle; it is less acrid, and tastes bitterish; this is stated to be Indian bdellium, the produce of *Amyris commiphera*, and perhaps other trees growing in Western Africa and through the East Indies.

Myrrh is a gum-resin consisting in 100 parts of 28 of resins, one of which is soft, aromatic, and soluble in ether, the other hard, odourless, and soluble in alkalies; 2·5 of volatile oil with the odour and taste of myrrh, and about 63 per cent of gum, three-fourths of it being soluble or arabine, the rest insoluble, like bassorin.

ADULTERATIONS.—Bdellium and other resins and gums are sometimes mixed with it; Righini proposes the following test of its purity, powder four parts of myrrh and four of muriate of ammonia, rub together for fifteen minutes, and add gradually, with stirring, from 60 to 100 parts of water; if pure, the mixture dissolves.

USES.— It acts as a mild stimulant and tonic, but is seldom given alone; other tonics, iron, or aloetic preparations being conjoined with it. Myrrh is prescribed in relaxed states of the system, with feeble digestion and circulation, and as it checks excessive mucous secretion it is employed in chronic catarrhs and diarrhœas; it was once supposed to operate specially on the uterus, as an emenagogue, although this idea is not now entertained, it is frequently exhibited in amenorrhœa and chlorosis, and is serviceable from its effects on the debilitated condition of body which is the source or attendant of the uterine affection. In gargles, the diluted tincture is used for ulcerated sore throat, and to correct the effects of salivation, while the powder is added to dentifrices for its agreeable odour, and is supposed to remove a soft or spongy state of the gums.

DOSE.—Gr. v to xxx, in powder, pill, or emulsion; myrrh enters into the compound iron pill, and mixture, the aloe and myrrh pill, galbanum pill, rhubarb pill, &c.

Tinctura Myrrhæ, D. L. E. *Tincture of Myrrh.*

Preparation.—D. Myrrh in coarse powder ℥iv, rectified spirit Oij; macerate for fourteen days, strain, express and filter.

L. Myrrh bruised ℥iij, rectified spirit Oij; macerate for fourteen days and filter.

E. Myrrh in moderately fine powder ℥iijss, pack it in a percolator, add rectified spirit Oij, and when f℥xxxiij have passed through, agitate well to dissolve the oleo-resinous matter which first passes through, and which lies at the bottom. It is much less conveniently made by digesting for seven days.

Dose.—fʒss to fʒij diluted with four to sixteen parts of water, or any mild decoction, which becomes milky from separation of the resin; it is seldom used internally, but is employed as a wash for the gums, and in gargles. It is sometimes applied as a stimulant to indolent or foul ulcers.

Decoctum Myrrhæ, D. *Decoction of Myrrh.*

Preparation.—Myrrh ʒij, triturate it with water f℥viijss, gradually added, then boil for ten minutes in a covered vessel, and strain about f℥viij.

Dose.—f℥ss to f℥ij, as a vehicle for other remedies; it is now introduced into the list of preparations, but has very slight medical activity.

ELEMI, D. L. E.

Several aromatic resinous products have been called by this name, the sources of which are little understood; of late years it has been brought from Mexico, and from imperfect specimens of the tree yielding it, Royle has determined the origin of this variety to be the—

Elaphrium Elemiferum, a tree about twelve feet high, with white, spongy wood, rugose brown bark, and grey epiderm, leaves without stipules, impari-pinnate, leaflets three to ten pair, varying in form; drupes ovoid, with a thick epicarp, splitting in two valves, seed single, one being abortive.

Elemi is imported in large square masses, covered by some monocotyledonous leaf, in irregular lumps, or in reeds; the latter variety is now scarce. It is a soft resin, of white colour, with a green hue, becoming by exposure pale yellow, hard, and brittle; its odour is strong and fragrant, like fresh ground pepper, or a mixed odour of fennel and lemons. A Brazil tree, the *Icica icicariba*, also produces a fragrant elemi; Guibourt describes this as imported in cases, weighing three or four hundred weight; it is semi-transparent, yellowish white, with greenish points, and of an agreeable odour, resembling fennel. Manilla elemi is less known, it is considered to be the produce of the *Canarium commune.* As analysed by Bonastre, it yielded 12·5 of volatile oil, sixty of resin, twenty-four of a resin termed elemine, insoluble in cold alcohol, two of bitter extract, and 1·5 of impurities. Factitious elemi has also been sold, made from resin, turpentine, and oil of spike; it is rarely met with at present.

USES.—To prepare elemi ointment, which is employed as a stimulant to old ulcers, and when diluted with oil of turpentine, constitutes the well-known warm dressing applied to parts from which sloughs are separating, bed sores, &c., to increase the formation of granulations.

Unguentum Elemi, D. *Unguentum Elemi Compositum,* L.
Ointment of Elemi.

Preparation.—D. Elemi ℥iv, ointment of white wax ℔j; melt together, strain through flannel, and stir constantly until concreted.

L. Elemi ℔j, suet ℔ij; melt, remove from the fire, and add common turpentine ℥x, olive oil f℥ij; mix, and strain through linen.

LEGUMINOSÆ. *Pod Bearing Plants.*—Trees, shrubs, or herbs, leaves alternate, with a tumid petiole, and two stipules; calyx free, segments often unequal; petals papilionaceous, or regularly spreading, stamens definite or numerous, peri or hypogynous, ovary simple, superior; fruit a legume, seeds without albumen. It is divided into three sub-orders:—

Papilionaceæ; with dentate or bilabiate calyx; petals butterfly shaped, composed of a large upper petal, the standard or vexillum, two lateral wings or alæ, and an inferior keel or carina, consisting of two petals joined at the margin; stamens ten, monadelphous, or nine united and one free.

MYROSPERMUM PERUIFERUM, E.
MYROXYLON PERUIFERUM, L. *Balsam of Peru Tree.*

Tall and branching, with thick, resinous bark; leaves pinnate, alternate, leaflets two to five pair, coriaceous; racemes axillary, calyx campanulate, petals white, style deciduous; legumes pale yellow, two inches long, forming a samara with thick wings, not veined; one seeded.

It grows in the low warm parts of Peru and Mexico; there is some confusion as to the mode in which the balsam is got, for incisions into the tree are said to afford a white liquid which when dried forms balsam of Tolu, but the extract procured by boiling the branches is the black balsam of Peru, hence L. considers this tree to yield both substances; it is more probable that the Peruvian balsam is also derived from a tree by incision. It is a thick fluid of the consistence of treacle, dark reddish brown, semi-transparent, of pleasant aromatic odour, and bitterish acrid taste; dens. 1·15. Analysed by Fremy, it gave an oil termed cinnameine; an acid, cinnamic acid formed by the oxidation of the oil, and usually mistaken for benzoic acid; and a quantity of resin, this constantly increases in the balsam, being produced by the oil uniting with the elements of water. Peruvian balsam dissolves in alcohol, and yields some of its odour and its acid if boiled in water.

ADULTERATIONS.—None probable; it is known to be pure, by its solubility in alcohol which leaves any fixed oil, and Martius states, that the acid in 1000 parts should saturate seventy-five parts of carbonate of potash.

USES.—It was at one time employed in phthysis from an idea that the disease depended on ulceration, and its stimulant effects often did harm; it is now seldom given internally, but may be used in chronic catarrh and some forms of asthma, like other stimulating gum resins. Externally it is applied alone, or in ointment, to promote granulations in ulcers, and sometimes to phagedenic and sloughing sores.

MYROSPERMUM TOLUIFERUM, D. L. E.

Balsam of Tolu Tree.

Branches and leaves smooth, leaflets oblong acuminate, thin and shining, other characters like M. Peruiferum.

It is found on the banks of the Magdalena, and the savannahs of Tolu, being a different species of the tree that yields Peruvian balsam, with which it was long confounded. Balsam of Tolu is got by incising the bark and collecting the exuding balsam in pots and small gourds; when fresh, it is yellow or reddish, soft like thick honey, fragrant, and with a sweetish, warm taste, by keeping it becomes hard and brittle; if heated, it burns with an agreeable odour; it dissolves in ether and alcohol; its composition, according to Fremy, is similar to balsam of Peru, except that it becomes easier resinified, but its taste is not acrid and much pleasanter than that substance.

USED.—For flavoring expectorant mixtures; it has also stimulant properties which render it useful in chronic catarrh and the subacute stages of more recent attacks. Tolu lozenges are a popular remedy for coughs, they can have little or no medical effects.

DOSE.—Gr. x to xxx in emulsion, seldom employed.

Tinctura Tolutana, D. E. *Tinctura Balsami Tolutani,* L.

Tincture of Tolu.

Preparation.—D. Balsam of Tolu ℥ij, rectified spirit Oj, dissolve with gentle heat, let the sediment subside, and decant the clear tincture.

L. Balsam of Tolu ℥ij, rectified spirit Oij, dissolve by digestion and filter.

E. Balsam of Tolu in coarse powder ℥iijss, rectified spirit Oij, dissolve with gentle heat.

Dose.—fʒss to fʒj in emulsion to suspend its resin.

Syrupus Tolutanus, D. L. E. *Syrup of Tolu.*

Preparation.—D. Boil balsam of Tolu ℥j, distilled water Oj, for half an hour in a lightly covered vessel, occasionally stirring, and strain when cold; then add twice its weight of refined sugar in powder, and dissolve by a steam or water heat.

L. as D. using balsam of Tolu ʒx, boiling water Oj, sugar ℔ijss.

E. Simple syrup, recently made and not quite cool ℔ij, add gradually tincture of Tolu f℥j, and mix.

Dose.—f℥j to iv added to cough mixtures; the form of E. is preferable being most simple, and is usually followed, or it is made extemporaneously by adding fʒss of the tincture to f℥j of simple syrup.

CYTISSUS SCOPARIUS, D. L. E. *Common Broom.*

A shrub, three to six feet high; branches long, green, and angular; leaves trifoliate, stalked, leaflets oblong; flowers yellow, axillary, stalked; calyx two-lipped, the upper often entire, the lower three-toothed; standard large, ovate; keel obtuse, enclosing the stamens and pistil; stamens united; pod dark brown, flat, hairy at the margins, with fifteen or sixteen seeds. It grows on sandy and uncultivated places, flowering in June.

Fresh broom tops have a peculiar odour when bruised, and a nauseous bitter taste; they have not been analysed; if burned, they afford 5·7 parts of an ash, 100 parts of which contain 29 of carbonate of potash, besides other salts.

USES.—In large doses it is purgative and emetic; in medicine it is employed in moderate doses as a diuretic, its action is very certain, and Pereira states he does not know a single instance in which it failed to act on the kidneys, hence it is often directed in dropsical effusions, alone or combined with other diuretic remedies; but the disappearance of the effusion is not the removal of its cause, which is too often beyond the power of drugs, although it is all that medicine can effect in these cases to relieve the patient and prolong his life in some degree of comfort. It is stated to be useless in thoracic dropsies, with pulmonary congestion, or in inflammations, and no diuretic should be employed in acute suppression of urine, which usually depends on a congested state of the kidneys, and can only be removed by free depletion. The infusion and decoction are prescribed.

Infusum Scoparii, L. *Infusion of Broom.*

Preparation.—Scoparium ℥j, boiling water Oj; macerate for four hours and strain. *Dose.*—f℥j to ij; the decoction is preferable.

Decoctum Scoparii, D. *Decoction of Broom.*

Preparation.—Broom tops dried ʒss, water Oss; boil for ten minutes, and strain off f℥viij.

Dose.—f℥j to ij, twice or thrice daily, with other diuretics.

Decoctum Scoparii Compositum, L. *Decoctum Scoparii*, E.
Compound Decoction of Broom.

Preparation.—L. Scoparium, juniper fruit, dandelion, of each ℥ss, distilled water Ojss; boil to Oj and strain.

E. Broom tops, juniper tops, of each ℥ss, bitartrate of potash ʒijss, water Oiss; boil down to Oj and strain.

Dose.—f℥j to ij.

GLYCYRRHIZA GLABRA, D. L. E. *Liquorice.*

Perennial, four or five feet high, leaves unequally pinnate, leaflets ovate, viscid beneath, no stipules; flowers blue, in axillary racemes, calyx tubular, five cleft; standard strait, ovate lanceolate, keel of two petals; stamens diadelphous; legume smooth, with three or four seeds.

It grows over Southern Europe, and is cultivated at Mitcham, in Kent, for the roots or underground stems, which run a considerable distance; liquorice roots when fresh are round and juicy, if dried they become wrinkled; they are brownish on the outside, and internally yellow and fibrous, of a faint sickly odour, and very sweet taste with slight acridity, from containing a small quantity of resinous oil; their sugar is termed glycyrrhizin or glycion, it is sweet, yellow, transparent, does not crystallize or undergo vinous fermentation, and dissolves in water or spirit; the roots also yield starch, albumen, woody fibre, asparagin, and salts.

USES.—The powder is used to involve pills, or to form them into proper consistence; thus, it is the best addition to make kreosote into a pill; the slightly acrid cortex is usually removed before powdering the root.

Extractum Glycyrrhizæ, D. L. E. *Extract of Liquorice.*

Prepared from the dried root, like extract of gentian.

This can be well made by percolating with cold water, but is seldom prepared as commercial extract of liquorice is largely imported from Spain and Italy; it forms dry, black coloured rolls, five or six inches long, the best kinds being marked with the word solazzi; they often contain impurities, which may be separated and a fine extract obtained, by packing the rolls with straw, and infusing them in cold water, until all soluble parts are removed; the adulterations remain behind as a soft mass like the original sticks, and the extract is got by evaporating the clear liquid; a preparation like this is sold as quintessence of liquorice.

Trochisci Glycyrrhizæ, E. *Liquorice Lozenges.*

Preparation.—Extract of liquorice ℥vj, gum arabic ℥vj, sugar ℔j; dissolve in a sufficiency of boiling water, and concentrate over a vapour bath to a proper consistence to form lozenges.

Popularly used for allaying the irritation of tickling cough.

ASTRAGALUS. *The Milk Vetch.*

Herbs or shrubs, calyx five-toothed, corolla with an obtuse keel, stamens diadelphous, legume two-celled or half two-celled from the lower suture turning inwards. The following species afford Tragacanth gum, according to the pharmacopæias:—

A: Verus, E. A small shrub, covered with spines, the remains of old petioles, leaflets hispid, eight or nine pairs; flowers yellow, axillary, in clusters. It grows in Armenia and Persia; the gum is collected from July to September, and exported to Europe and India.

A: Gummifer, D. L. Leaflets smooth, four to six pairs; flowers three to five, sessile; calyx five cleft, it and the legumes woolly. It grows in Lebanon and Koordistan, and yields a white tragacanth.

Other species also are known to yield the gum.

Tragacanth exudes naturally, or from wounds made in the plants, and hardens in the air. De Candolle gives the following explanation of the process by which gum is produced; it is the nutritious juice of the plant, contained in the bark and alburnum, hence its loss causes the tree to become sickly, like hemorrhage in animals; its escape depends on the wood absorbing moisture from the air, and swelling more than the bark which is distended and lacerated, permitting the gum to flow out. Tragacanth forms thin wiry flakes, or tortuous wrinkled pieces; it is tough like horn, powdered with difficulty unless it is heated, or in cold weather; its colour varies from white to reddish yellow, and its value is proportional to its paleness; in water it swells, softens, and becomes a thick mucilage, of one hundred parts, about fifty-three to fifty-seven dissolve; this proportion, termed tragacanthin is analogous to gum arabic, but distinguished by not precipitating with silicate of potash; the insoluble part resembles gum bassora, it absorbs water, though it does not dissolve; Guibourt considers tragacanth a peculiar gelatinous matter, mixed with a little starch and woody fibre.

USES.—In powder it is employed to suspend heavy drugs, as calomel or subnitrate of bismuth, and in mucilage as a substitute for gum arabic; the confectioner forms lozenges with it, for which it is well adapted and cheap.

Pulvis Tragacanthæ Compositus, L. E. *Compound Powder of Tragacanth.*

Preparation.—Starch ℥iss, pure sugar ℥iij, mix and add tragacanth bruised ℥iss, gum arabic bruised ℥iss, mix.

A useless compound, the starch being insoluble until boiled, and it then forms a mucilage which would be got just as well from starch or tragacanth alone. It is used to administer heavy or irritating remedies, and as a demulcent.

Mucilago Tragacantha, E. *Mucilage of Tragacanth.*

Preparation.—Tragacanth ʒij, boiling water f℥ix, macerate for twenty-four hours, triturate to dissolve the gum, and strain through linen or calico.

It forms a thicker mucilage than sixteen times its weight of gum arabic; being therefore cheaper and perhaps quite as good, it is preferable to the acacia mucilage; when kept both are liable to become sour.

Dose.—fʒi to iv, added to mixtures.

MUCUNA PRURIENS, D. L. E. *Cowhage Plant.*

A twining shrub, leaves ternate; flowers of a garlic odour, in racemes; standard flesh-colored, alæ purple, keel greenish white; stamens diadelphous; pods roundish, as thick as a finger, with valves somewhat keeled, densely covered with stiff hairs.

It grows in the West Indies, whence the pods are imported; they are brownish and covered with strong stinging hairs; when magnified these resemble small pointed porcupines quills, finely serrated towards their apex; they contain, according to Martius, some tannin, but no acrid principle. In the East Indies another variety of the plant is found, the *M: Prurita*, having smaller leaflets and purple flowers.

USES.—The hairs are irritant, causing extreme itching when applied to the skin; they are used in some instances to detect feigned diseases in soldiers, and might be of service in cases of narcotic poisoning. Internally they are given in electuary as a remedy for worms, in particular for the round worm, ascaris lumbricoides, and the thread-worm, ascaris vermicularis; their action is supposed to be mechanical, the sharp spiculæ wounding the worms, and thus dislodging them from the mucous surface.

DOSE.—Enough of the hairs are added to treacle or honey to form an electuary, of which one or two teaspoonfuls are given every morning; they do not produce any apparent irritation of the mucous membrane, and hence require to be followed by a brisk purgative after three or four days.

PTEROCARPUS SANTALINUS, L. E.
Red Sandal Wood Tree.

A lofty tree, leaflets three, rarely four or five, roundish, smooth above; flowers in axillary racemes; calyx five-toothed; petals long-clawed, standard yellow, streaked with red, stamens diadelphous; legume stalked, suborbicular, one seeded, with a membranous wing, indehiscent.

Red saunders or sandal wood, is imported in angular billets, blackish externally, blood-red inside, heavy, compact, and capable of fine polish, tasteless and odourless; its colouring matter is extracted by alcohol, and alkaline solutions also dissolve it, and change it to violet tint; Pelletier terms this substance santalin; the wood contains about 17 per cent. of it. Saunders wood is used as a colouring addition to compound tincture of lavender by L. and E. It is not employed by D.

GUM KINO, D. L. E.

This gum is derived, according to the colleges, from the *Pterocarpus Erinaceus*, a native of Africa, about Senegal and Gambia, and other undescribed plants; it yields a brittle, shining, dark gum of astringent taste, when its branches are wounded, but it does not seem to be collected, and no kino is imported from Africa.

P. Erinaceus.—About forty feet high, leaves deciduous, leaflets alternate, smooth above, downy underneath; flowers yellow; legumes orbicular, membranous, one or two celled, each one-seeded.

Pereira has traced the kino of English commerce, to Malabar in the East Indies, and Royle and others have determined its source to be the,—

P: Marsupium,—A lofty tree, its bark outside is brown, inside red, fibrous and astringent; leaflets alternate, deep green, shining, three to five inches long; petals white, tinged yellow; stamens ten, united below, but in two parcels of five each above; legume long-stalked, three fourths orbicular, the upper side strait, with a wavy membranous border; seed solitary.

Kino is said to be procured by making longitudinal incisions in the bark while the tree is in blossom, the gum oozes out and is collected on a broad leaf, fixed in the bark, which conveys it into proper vessels, it is then hardened in the sun until it crumbles, and filled into boxes for exporting. It is in small, brittle, angular fragments, without smell, and of a dark reddish brown colour, shining, opaque, but in thin pieces transparent and ruby red; it colours the saliva red, and has a very astringent taste; water partially dissolves it, forming a decoction which becomes turbid when cool, in alcohol it is nearly all soluble. Vauquelin states that it consists of tannin and peculiar extractive 75 parts, red gum 24 parts, and insoluble matter 1 part, in 100.

USES.—It is astringent, having nearly similar effects to catechu, but is less active, and is prescribed in diarrhœa, chronic dysentery, and sometimes for chronic hemorrhages from the intestines or uterus. Locally it may be applied for relaxation of the tonsils and uvula, or used in gargles; or for stimulating flabby ulcers.

DOSE.—Gr. x to xxx of the powder; this is seldom given.

Tinctura Kino, L. E. *Tincture of Kino.*

Preparation.—L. Kino bruised ℥iijss, rectified spirit Oij, digest for fourteen days, and filter.

E. Made as L. digest for seven days; it cannot be conveniently obtained by percolation, unless mixed with an equal weight of fine sand.

It sometimes gelatinizes when kept, the cause of this is not fully understood; its dose is fʒj to iij added to chalk mixtures or other astringents.

Pulvis Kino Compositus, L. *Compound Powder of Kino.*

Preparation.—Kino ʒxv, cinnamon ʒiv, hard opium ʒj, powder and mix.

Used as an astringent and anodyne in diarrhœa and dysentery, and employed with considerable benefit in some attacks of pyrosis.

Dose.—Gr. v to xx; twenty grains contain one grain of opium.

SUB-ORDER, *Mimoseæ.*—Calyx free, sepals and petals valvate; stamens hypogynous, monadelphous or free; legume usually bivalved, one celled, sometimes divided by transverse partitions into several cells.

ACACIA, *Various Species yielding Gum.*

Shrubs or trees, with or without thorns, flowers yellow or white, rarely red, in heads or spikes, polygamous; calyx four or five toothed; petals four or five free, or cohering to form a cleft corolla; stamens 10 to 200; legume continuous, dry, bivalved.

Gum exudes spontaneously and is sometimes obtained by incisions from many species of this widely scattered family of plants, it abounds most in hot summers, and being the juice of the trees, its excessive loss renders them sickly. It is exported from many parts of Africa, India, and New Holland.

Gum Arabic, so termed from its supposed source, is the produce of several shrubs, as the *Acacia Seyal*, *A: Ehrenbergii*, and probably the *A: Vera*, and *A: Arabica*, as the desert abounds in acacias; it is brought in great quantities from Africa to Aden, and reaches Europe through the Mediterranean; this gum used to be got from Upper Egypt, and much of it is the produce of Kordofan; it is in round or angular masses, varying from the bulk of a pea to an almond or larger, transparent, or opaque from numerous cracks, without smell, easily broken, colourless or of a yellow hue, and of dens. 1·3 to 1·5; the best pieces when picked are sold as elect gum; it entirely dissolves in its own weight of water, forming a thick mucilage, which becomes sour and decomposed by keeping; analyzed it yields 79 parts of soluble gum or arabin, 18 of water, and 3 of ashes in 100 parts, it is insoluble in alcohol.

Gum Senegal is brought from Sierra Leone, and those settlements on the west of Africa, its largest source is the gum forests, north of the Senegal; the Acacia Verek is said to yield the first quality, and other plants an inferior reddish gum. Its tears are larger than gum arabic and more difficult to powder, they are often hollow, and usually of yellow colour.

Barbary gum is exported from Morocco, this is of inferior value, one description of it consists of coloured tears, imperfectly soluble in water, the other is in broken fragments like gum arabic. *East India gum* is imported from Africa to Bombay and thence to Europe, it is very similar to gum arabic; some of good quality is also stated to be produced in India. *Cape gum* is pale yellow and considered a second rate kind; it is collected by the Caffres on the banks of the river Gariep.

ADULTERATIONS.—The finer kinds are often mixed with inferior gum; if soluble in water, some degrees of colouring does not seem objectionable, although it lowers its commercial value. Powdered gum is liable to have starch added to it, this is detected by becoming blue with iodine.

USES.—Gum is nutritious, but never employed with this intention; as it forms a thick mucilage when dissolved, it was supposed to be demulcent and given to allay the scalding in gonorrhœa, over which it can have little influence; in irritation of the glottis and fauces causing the troublesome cough of catarrh, or in phthysis, gum in confectionary, as jujubes, or in cough mixtures may perhaps be of slight benefit; and from habit it is usually added to all expectorant mixtures. It is useful to suspend oils or resins as castor oil, copaiba, turpentine, &c., and insoluble powders such as musk, oxide of zinc, and subnitrate of bismuth; as a vehicle for forming pills it is objectionable from soon becoming very hard. It may be used ad libitum.

Mucilago Acaciæ, D. *Mistura Acaciæ,* L. *Mucilago,* E.
Gum Arabic Mucilage.

Preparation.—D. Gum arabic ℥iv, water f℥vj, dissolve with occasional stirring and strain through flannel.

E. Gum ℥ix , water Oj, dissolve without heat, occasionally stirring, and strain through linen or calico.

L. Acacia powdered ℥x, rub with boiling water Oj, gradually poured in, and strain.

The D. and E. forms are preferable, being made without heat, and free from the expense of powdered gum; if kept it becomes muddy, sour, and unfit for medical use. Dr. Montgomery states that to form emulsions, oils require three-fourths of their weight of mucilage; balsams and spermaceti, an equal quantity; resins, two parts; and musk, five times its weight.

Mistura Acaciæ, E. *Mixture of Gum Arabic.*

Preparation.—Sweet almonds ʒx, steep in hot water, peel and beat them to a smooth pulp in an earthenware or marble mortar, with pure sugar ʒv, then with mucilage f℥iij, add water Oij gradually, stir constantly, and strain through linen or calico.

This is another form of almond milk, it is used as a demulcent for drink, or as a vehicle for other remedies.

Trochisci Acaciæ, E. *Gum Lozenges.*

Preparation.—Gum arabic ℥iv, starch ℥j, pure sugar ℔j, mix, powder, and make them into a proper mass with rose water, to form lozenges.

ACACIA CATECHU, D. L. E. *The Catechu Acacia.*

A tree twelve to twenty-five feet high, with hard wood, the duramen dark red, and the alburnum white; its stipules change to thorns, leaves bipinnate, pinnæ ten to fifteen pairs, leaflets thirty to fifty pairs, petiole often with a row of spines on its under surface; flowers many, white, in spikes; petals united; stamens distinct, numerous; legumes thin and smooth, with four to six seeds.

This tree grows in the jungles and low hills of many parts of India, and is now common in Jamaica, its wood affords one of the substances termed catechu. D. and E. state the leaves of the *Uncaria Gambier* yield another variety; and E. in addition asserts that the kernels of the *Areca Catechu*, and probably other plants afford an extract also sold under a similar name. In preparing it from the Acacia Catechu, the wood is chipped into small pieces, these are placed in earthen pots filled with water, and arranged along a mud fire-place, when the water has boiled away very much, the clear liquor is strained into another pot, and the process repeated with fresh materials; the extract is lastly evaporated until of sufficient consistence to pour into moulds. Catechu is imported in square and roundish masses, and in balls covered with leaves or rice husks; its colour varies from pale whitish or light brown, to a dark hue, perhaps from protracted boiling or want of care in manufacture; its taste is strongly astringent and bitterish, followed by some sweetness, it has no odour; catechu was analyzed by Davy, he found it to consist of—

Dark or Bombay Catechu,	Tannin,	44·5	Extractive,	34·0	Mucilage.	6·5	Insoluble residue.	5·0
Pale Bengal Catechu,	,,	48 5	,,	35·5	,,	8·0	,,	7·0

The tannin is very similar to that from galls, on it the effects of the drug depend, and its amount varies in proportion to the goodness, or rather adulteration of the catechu; the extractive matter termed catechine, or resinous tannin, may be got by dissolving out the common tannin with cold water from the catechu, the insoluble residue when purified by solution in alcohol and crystallizing, deposits silky needles of catechine, composed of $C_{15}H_6O_6$.

ADULTERATIONS.—Dirt and sand often being added to it, and more or less attention used in its preparation, its strength is liable to vary. E. therefore directs the amount of tannin to be determined by separating it with ether, the first quality yields 53, and the lowest, 28 per cent of tannin when dried at 280°; but catechine being also soluble, it is requisite that the dry mass should be acted on with water, which dissolves out the tannin alone.

USES.—It is a valuable astringent, often employed for diarrhœa, in infusion or combined with chalk mixture and opiates; it is also of service for old dysenteries, and in slight recent attacks of this disease; sometimes too it is employed for passive hemorrhages, and menorrhagia. In gargles or lozenges it is prescribed when the mucous membrane of the fauces and uvula is relaxed, producing troublesome cough from irritating the glottis, a good method of using it for this affection, is to apply the undiluted tincture with a brush to the part; singers, or those who speak much, employ catechu to relieve hoarseness; and some have advised its exhibition to check excessive mucous discharges, such as those occurring from the bladder or urethra, but it is seldom given with this intention. An ointment containing powdered catechu has been directed as a local astringent dressing for ulcers, and the undiluted tincture is applied to chapped nipples.

DOSE.—Gr. x to ʒj, seldom employed except in relaxed sore throat, when some prefer using a lump of pure catechu to any preparation of it.

Infusum Catechu Compositum, D. L. *Inf: Catechu*, E. *Infusion of Catechu.*

Preparation.— D. Catechu in coarse powder ʒiij, cinnamon bruised ʒss, boiling water f℥ix, infuse for half an hour, and strain off about f℥viij.

L. Catechu ʒvj, cinnamon ʒj, boiling water Oj, macerate for one hour and strain.

E. made as L. Macerate for two hours, strain through linen or calico, and add syrup fʒiij.

Dose.—f℥ss to f℥ij three or four times daily, as an astringent; opiates are often conjoined with it. The infusion may also be used for a gargle.

Tinctura Catechu, D. L. E. *Tincture of Catechu.*

Preparation.—D. Catechu in coarse powder ℥iv, cinnamon bruised ℥ij, proof spirit Oij, macerate for fourteen days, strain, express and filter.

L. Catechu in fine powder ℥iiiss, cinnamon bruised ℥iiss, proof spirit Oij, macerate for fourteen days and strain.

E. as L. Macerate for seven days, express the residue and filter; or pack the dry powders in a percolator, and percolate the spirit.

Dose.—fʒj to ij, added to chalk mixture, or the infusion of catechu.

Pulvis Catechu Compositus, D. *Compound Powder of Catechu.*

Preparation.—Catechu ℥ij, kino ℥ij, cinnamon ℥ss, nutmeg ℥ss; powder each, mix and pass through a fine seive; when prepared, keep it in stoppered bottles.

This differs from the old compound kino powder of D., in containing no opium, and is properly named from its chief constituent. *Dose.*—Gr. v to xx as an aromatic and astringent in diarrhœa, &c.; it forms the following preparation:—

Confectio Catechu Compositum, D. *Electuarium Catechu,* E.
Confection of Catechu.

Preparation.—D. Compound powder of catechu ℥v, simple syrup f℥v, gradually mix.

E. Catechu ℥iv, kino ℥iv, cinnamon ℥j, nutmeg ℥j, powder these and mix with opium ʒiss, diffused in a little sherry, add it to syrup of red roses boiled to the consistence of honey, Oiss, and beat all into an uniform mass.

Dose.—ʒss to ʒij, they differ importantly, in the E. preparation containing two grains and a quarter of opium in every ℥j; that of D. has no opium in it, which is preferable, as it can be added when necessary, by specifying the quantity. D. also intends this confection to be made extemporaneously from the powder, as required, by mixing with an equal quantity of syrup.

SUB-ORDER, *Cæsalpineæ.*—Calyx five toothed or bilabiate, deciduous or withering; corolla irregular, spreading, of five petals; stamens ten or fewer from abortion, often unequal, usually free.

HÆMATOXYLON CAMPEACHIANUM, D. L. E.
Logwood.

A tree about forty feet high, stem crooked, and spiny when in dry situations, leaves pinnate two to four from the same point, leaflets two to four pairs, obovate; sepals united into a persistent tube, the lobes deciduous; petals larger than the sepals; stamens ten; legume small, flattened, pointed at each end, two seeded.

It is a native of Campeachy, and now grows wild in Jamaica; the outer sapwood is not used being light coloured, the inner part is dark red, hard and tough, this is chipped for medical purposes, its odour is faint and agreeable, its taste sweetish but astringent; analysed by Chevreul it afforded volatile oil, a resinous matter, a subtance containing tannin, wood, salts, and a red crystalline body termed hæmatoxylin, which is sometimes found in large crystals in the wood, its taste is astringent and slightly bitter. When boiled in water, logwood forms a dark red fluid, which alkalies turn purple.

Uses.—It is a good remedy in chronic diarrhœa and dysentery, being mild in its effects it does not cause constipation, and hence may be continued longer than other astringents; kino, catechu, opiates, and sometimes port wine are added to it. For passive hemorrhages it has been employed, but is not depended on, and Dr. Perceval gave it to relieve the sweating of phthysis. Its colouring matter is absorbed, and passing off through the kidneys, may be mistaken for blood; this is distinguished by the urine containing no serous albumen, and therefore not coagulating with heat; the microscope also shews the absence of blood globules.

Decoctum Hæmatoxyli, D. E. *Decoction of Logwood.*

Preparation.—D. Logwood chips ℥j, water Oss, boil for ten minutes, and strain off about f℥viij.

E. Logwood chips ℥j, water Oj, boil down to f℥x, adding towards the end, cinnamon in powder ʒj; and strain.

Dose.—f℥j to ij.

Extractum Hæmatoxyli, L. E. *Extract of Logwood.*

Preparation.—L. Logwood powdered ℔iss, boiling water cong. ij, macerate for twenty-four hours, boil down to cong. j, strain while hot, and evaporate to a due consistence.

E. Logwood chips ℔j, boiling water cong. j, macerate for twenty-four hours, boil down to Oiv, and evaporate.

This is best made by the E. form, and should be evaporated until it is brittle when cold; it forms a good addition to the decoction, if well made; in pills, it is said to pass unchanged through the bowels. *Dose.*—gr. x to xxx.

TAMARINDUS INDICA, D. L. E. *Tamarind Tree.*

A tree, thirty feet high, of elegant foliage; leaves alternate, abruptly pinnate, with ten to fifteen pairs of leaflets, which are small and obtuse; flowers in racemes, yellow veined with red; calyx tubular, bilabiate above; petals three, unilateral; stamens two or three united, seven short and sterile; legume with a hard, brittle rind containing an acidulous pulp, and three to twelve smooth hard seeds. Two varieties are described, the East Indian with three to twelve seeds, and the West Indian with one to four seeds; but Royle states there is no such distinction.

Tamarinds are brought from the East Indies, preserved by drying; in the West Indies, the shell is removed and the pulp mixed with sugar; it consists of the oval brown seeds, a number of strong vegetable fibres, and a brownish pulp of sweet, acidulous taste. The latter, analysed by Vauquelin, was found to contain citric acid 9·4, tartaric acid 1·5, malic acid 4·5, bitartrate of potash 3·25, sugar 12·5, gum 4·7, pectin 6·25, in every 100 parts, mixed with water and fibres. They are added to confection of senna, and their acid taste renders them agreeable in some febrile affections; full doses of tamarinds act as a laxative, but are seldom employed for this purpose; tamarind whey is used as a drink in slight feverish attacks, it is made by boiling milk Oj, tamarinds ℥j, and straining.

CASSIA FISTULA, L. E. *Purging Cassia.*

A showy tree, foliage like the ash, and flowering as laburnam; leaves twelve to eighteen inches long, with four to eight pair of leaflets, stipules minute; flowers in racemes, yellow and fragrant; legume cylindrical, one or two feet long, indehiscent, marked with three bands externally and divided into cells by transverse partitions, each containing one seed, surrounded by a soft blackish pulp.

It is a native of the east, whence its pods are imported, and also from the West Indies where it is now naturalized; the pulp is used, it is prepared by pouring water on the bruised pods to wash out the pulp, pressing it through a seive, and evaporating it to a thick extract. These pods are best that are heavy, and in which the seeds do not rattle; it yields much sugar, gum, a kind of tannin, extractive and colouring matter. In small doses it is mildly laxative; a larger quantity acts as an aperient; Valisnieri states that if added to manna it increases its activity considerably, but this is doubtful.

Electuarium Cassiæ, L. *Electuary of Cassia.*

Preparation.—Manna ℥ij, bruise and dissolve in syrup of roses f℥viij, mix with cassia pulp ℔ss, tamarind pulp ℥j, and evaporate to a proper consistence. *Dose.*—ʒij to ℥j.

CASSIA, *Species yielding Senna.*

Three varities of senna are found in English commerce, distinguished as the common African, the Alexandrian, and the Tinnivelly senna, and other descriptions are met on the continent.

Tinnivelly senna is a cultivated variety, grown in India, in a district of that name, from seed probably obtained through Arabia; it is of fine quality and has been highly esteemed in this country since its importation a few years past, it will probably supersede the other sennas as it is picked with care. Its leaflets are lanceolate, thin, one or two inches long, and of a light green colour if fresh, by keeping in moist air, they change to a yellow hue; it operates as a mild and certain purgative. D. states its source to be the Cassia elongata, C: lanceolata of Royle.

A bushy annual three feet high, very leafy and flowering luxuriantly when cultivated; leaves alternate, abruptly pinnate, leaflets five to eight pairs, with short petioles, ovate acute in the lower, and lanceolate in the upper part of the plant; racemes axillary and terminal; legumes pendulous, membranous, flat and many-seeded.

According to Royle, it yields Tinnivelly senna, and that growing in the African desert, south and east of Syene, and collected for Cairo, forming half of the Alexandrian senna.

Alexandrian senna is broken, impure, and adulterated; for many years it was considered the best kind, but its use is now decreasing since Tinnivelly senna has become known. It is collected in Upper Egypt by Arabs, who cut down the plants in spring and autumn, dry them in the sun and strip off the leaves; these are brought to several depots and finally to Boulak, near Cairo, where five parts of lanceolate senna are mixed with three of ovate senna grown in Syria, and two parts of argel leaves brought from Upper Egypt; the trade is monopolized by the Pacha, and the senna exported from Alexandria in bales. It is pale green, with a faint odour, the leaves much broken and mixed with impurities, that are sometimes picked out before selling it, leaving the argel leaves which are distinguished by their thick structure, by having both sides of the leaf near the petiole of equal size, and by the imperfect developement of their lateral nerves; the medical effect of these leaves are as yet doubtful. D. states that this senna is the produce of Cassia acutifolia; it is composed one half of the C: lanceolata already described, mixed with the following variety which grows in Syria and over Africa, and adulterated with argel leaves.

C: Obovata, a perennial, one or two feet high; leaves equally pinnate, leaflets four to six pairs, obovate obtuse, unequal at the base, stipules lanceolate, rather stiff and spreading; flowers yellow, in racemes; legumes broad, smooth, lunate, rounded at each end, with six to eight seeds.

Common or Bombay senna is in ordinary use; the leaflets are thin, pale green, or yellowish if old, one to one and a half inches long, often mixed with stalks, pods, masses of dark brown leaflets and other impurities; its quality is usually good, and its cheapness causes it to be much employed; it is brought from Africa and Arabia to Bombay, and re-shipped thence to England in bales; its source is probably the same plant which yields Tinnivelly senna, growing in poor soils, and producing a smaller and weaker leaf; if a little care was used in picking out its stalks, both its appearance and value would be much increased.

It is the produce of C: lanceolata, and perhaps in part of C: Forskalii, distinguished by having only four or five leaflets, and a small brown gland a little above the base of the petiole; its pods are erect, and when young, are sparingly covered with coarse hairs.

ADULTERATIONS.—The pods and stems are picked from the best sennas, being considered inert, although they are not so, for the pods were formerly the only part employed. In Alexandrian senna, argel leaves are always found, they cannot be an important adulteration, and are fancied to produce both griping and purging; the leaflets of the Tephrosia Apollinea are also mixed with it, folded up longitudinally, they are obovate, downy, and have the lateral veins parallel, running oblique to the midrib; their effects are unknown.

COMPOSITION.—Senna contains an odorous oil, albumen, colouring, salts, and a purgative principle, cathartin, it is described as not crystallizing, yellowish red, soluble in alcohol and water, and having a disagreeable flavor; it would require further examination. Cold and hot water, proof and rectified spirit, each extract the effective portion of senna, and by protracted boiling, its properties are injured.

USES.—An active and certain purgative, it often causes griping and nausea, and its taste is objectionable; it operates chiefly on the small intestines, its purgative part is also absorbed, for when nurses use its infusion, it acts on the infant, and has caused purgation when thrown into the veins. It is given to children as a domestic remedy, and in practice prescribed in combination with saline cathartics; like all drugs of a similar description, it should not be used in inflammatory affections of the bowels, as peritonitis, in which constipation is oftener a consequence of the disease than its cause, and wherever it seems desirable to remove this, the gentlest aperients or enemata are alone admissible.

Infusum Sennæ Compositum, D. L. *Infusum Sennæ,* E. *Infusion of Senna.*

Preparation.—D. Senna leaves ℥ss, ginger sliced ʒss, boiling water Oss, infuse for one hour in a covered vessel, and strain off about f℥viij.

L. Senna ʒxv, ginger sliced ℈iv, boiling water Oj, macerate for one hour and strain.

E. Senna ℥iss, ginger sliced ℈iv, boiling water Oj; macerate for one hour, and strain through linen or calico.

Dose.—f℥j to iv, as a purgative, to which neutral purgative salts are often added; in practice it is obtained more easily by putting the leaves in cold water, heating them to boiling, and then letting them infuse for ten minutes and straining.

Infusum Sennæ Compositum, E. *Compound Infusion of Senna.*

Preparation.—Senna ʒj, tamarinds ℥j, coriander bruised ʒj, muscovado ℥ss, boiling water f℥viij, infuse for four hours in a covered vessel not glazed with lead, and strain through linen or calico. It may be made with two or three times the quantity of senna.

The tamarinds disguise the flavor of senna, and in preparing it at least double the quantity of senna should be used. Its dose is f℥j to iij, with which saline purgatives may be prescribed, but tartrate of potash is well known to be incompatible, as the tartaric acid of the tamarinds forms bitartrate of potash with it.

Enema Catharticum, E. *Cathartic Enema.*

Preparation.—Senna ℥ss, boiling water f℥xvj, infuse for one hour, strain and dissolve sulphate of magnesia ℥ss, sugar ℥j, add olive oil f℥j, and mix by agitation.

Used as a purgative injection, and to constitute part of the fetid enema, E. a rapid made decoction might be substituted for the infusion; the sugar is useless.

Tinctura Sennæ Composita, D. L. E. *Compound Tincture of Senna.*

Preparation.—D. Senna ℥iv, caraways bruised ʒss, cardamoms bruised ℥ss, proof spirit Oij, macerate for fourteen days, strain, express, and filter.

L. Senna ℥iijss, caraways bruised ℥iijss, cardamoms bruised ʒj, raisins stoned ℥v, proof spirit Oij, macerate for fourteen days and strain.

E. Sugar ℥iiss, coriander bruised ʒj, jalap in moderately fine powder ʒvj, senna ℥iv, caraways bruised ʒv, cardamoms bruised ʒv, raisins bruised ℥iv, proof spirit Oij, digest for seven days, strongly express and filter. It may be better made by percolation; if Alexandrian senna is used the argel leaves should be picked out.

A warm aperient, added to purgative mixtures, or given with castor oil.

Dose.—fʒij to f℥j.

Syrupus Sennæ, L. E. *Syrup of Senna.*

Preparation.—Senna ℥iv, boiling water Oj ℥iv, infuse for twelve hours strain and press strongly through calico, so as to get Oj ℥ij of liquid at least; concentrate treacle ℥48. in a vapor bath as far as possible, or until a little taken out on a rod nearly concretes on cooling, and while still hot, add the infusion, stir well, and remove from the vapor bath when mixed. If Alexandrian senna is used, it must be freed from argel leaves.

L. Senna ℥iiss, fennel bruised ʒx, boiling water Oj, macerate with a gentle heat for one hour, strain and mix manna ℥iij, sugar ℥xv, and boil to a proper consistence.

Dose.—fʒj to iij for children, as a laxative.

Confectio Sennæ, D. L. *Electuarium Sennæ*, E. *Confection of Senna.*

Preparation.—D. Brown sugar ℥viij, water Oij, dissolve and beat with pulp of prunes ℥v, pulp of tamarinds ℥ij, to a uniform consistence, add senna in fine powder ℥ij, coriander in fine powder ℥j, oil of caraway fʒss, and mix thoroughly in a water bath for ten minutes.

L. Senna ℥viij, coriander ℥iv, powder and seive out ℥x, then boil water Oiij, figs ℔j, liquorice ℥iij, down to half, strain and evaporate in a water bath to ℥xxiv, to this add sugar ℔iiss, and make a syrup; lastly rub tamarind pulp, prune pulp, and cassia pulp, of each ℔ss with the syrup, add the powder and mix.

E. Same as L. omitting the tamarind and cassia pulp, and using prune pulp ℔j, and water Oiij f℥v.

When well made it is a good and mild aperient; it should always be prepared by the dispenser to avoid adulterations, jalap often being substituted for senna, and rotten apples for the fruit. It is prescribed in affections of the rectum, and during pregnancy. *Dose.*—ʒj to ℥j.

COPAIFERA, D. E. *Species yielding Copaiba.*

Calyx without bracts, four-parted; sepals small; no petals; stamens ten, distinct; legume stalked, obliquely elliptical, two-valved, with two ovules; one seeded, with an aril; leaves alternate and pinnate, leaflets coriaceous, ovate; flowers in panicles.

L. assigns the C. Langsdorfii as its source; many species, however, contribute to afford copaiba in the West Indies and tropical America; it is procured by incising the trunk of the trees, at the end of the rainy season, and flows out with such abundance that ℔xij are stated to be obtained in three hours, and old trees will yield it twice or thrice in the year. Copaiba is an oleo-resin, distinguished from true balsams by containing no benzoic acid; it is a clear, pale yellow oily liquid, of peculiar, rather aromatic odour, and nauseous disagreeable taste, with some acridity; its dens. is ·95 to ·96; by keeping it becomes darker coloured and denser. Its colour, odour, and gravity are liable to vary, as its origin is from different sources, and as the trees differ in age; it is also stated that those growing in the hot moist parts of Brazil afford a thin pale fluid, while those in the dry inland districts have less balsam, but which contains more resin. The products of analysis are different in old and fresh copaiba, for with age the volatile oil escapes in part, and some of it becomes resin; Gerber gives the following proportions:—

Fresh copaiba. volatile oil 41,	yellow hard resin 51·4,	brown soft resin 2·18,	water and loss 5·44.
Old copaiba, „ 37.7,	„ 53.7,	„ 11·15,	„ 4·10.

The hard resin, or copaivic acid, is brittle and crystallizable, reddening litmus, and forming compounds with bases like pinic acid. The soft resin is deposited from an alcoholic solution of copaiba as it cools; it has little affinity for bases.

ADULTERATIONS.—If cheap, it is sold tolerably pure; when its value is greater, it may be mixed with common oils, and turpentine. The best evidence of good copaiba is its peculiar odour; whenever this is not very manifest, although the balsam may be genuine, it is not of much efficacy; and if time permits, a more satisfactory test is distilling a portion, as proposed by Mr. Redwood; it should yield forty per cent of volatile oil; inferior descriptions will, however, give far less. Turpentine may be recognised when present, by its smell on dropping some of the copaiba upon a hot iron; and fixed oils leave an oily rim round the resin which remains when copaiba is heated on blotting paper. Planche states that if shaken with ammonia water, of dens. ·955, pure copaiba becomes clear. It should be "soluble in two parts of alcohol; dissolve one-fourth its weight of carbonate of magnesia with the aid of heat, and continue translucent. E."

USES.—Like other oleo-resins, in large doses it irritates the stomach and bowels, causing nausea, vomiting, and purging; it has sometimes produced hæmaturia, and an eruption like measles has followed its employment. Moderate doses cause warmth in the stomach, with disagreeable eructations; it becomes absorbed, and can be detected in the breath of those using it, though it is in great part discharged by the kidneys, which it stimulates, increasing their secretion, and imparting to it the odour of the drug; the urine is liable to become turbid at times under its influence as if containing mucus.

It acts specially on the lining membrane of the urethra, hence it is employed for gonorrhœa, some prescribing it in full doses, from the commencement of the disease, without any preceding treatment; as this is considered liable to increase the inflammatory symptoms when they are severe, the usual method is to employ during the first stage saline purgatives, and other means of subduing inflammation, and then give the balsam in moderate doses twice or thrice daily; it should be observed, that while many suffer acutely with each attack of gonorrhœa, others complain only of a slight itching feeling, and that a first attack is the most painful, and commonly requires these antiphlogistic remedies; in succeeding gonorrhœas, when the symptoms are slight, copaiba may be exhibited at once with success; it should be persevered in for eight or ten days, and if it then fails, the treatment should be changed to cubebs or astringent injections. In females it is less successful, perhaps because the disease is vaginal, and the balsam does not come in contact with its source, therefore its effect can be merely constitutional, and lotions are more relied on. Copaiba has also been employed in injections for both sexes, in this disease and for leucorrhæa; in females, it is stated with some benefit. For chronic catarrh of the bladder it may be given in small doses, as gtt v to viij, thrice during the day, like the method of employing cubebs in this affection advised by Sir B. Brodie; in bronchial catarrhs of long standing it is sometimes directed in the form of emulsion to restrain excessive mucous secretions; and for chronic diarrhœa and dysentery a similar mixture is at times found useful.

DOSE.—fʒss to fʒj, thrice daily; for catarrhs, gtt v to xx should be given; and for diarrhœa larger doses, as fʒj to fʒiss; it may be taken floating on water, to which an aromatic tincture, as orange, is occasionally added, or an emulsion can be formed of it with yolk of egg or mucilage; for some years past capsules of gelatine, each containing about gtt x of balsam, have been sold; at least two should be used for a dose. Train oil has in some instances been found in these capsules, instead of genuine copaiba.

Pills of Copaiba. Soubeiran.—Copaiba f℥j, calcined magnesia ʒvj to viij, or carbonate of magnesia ℥j, mix, after several hours the mass becomes of a consistence to form pills.

Pills of Copaiba. Thierry.—Copaiba fifteen parts, hydrate of lime one part, mix and heat over a vapor bath for four hours, stirring occasionally until the lime disappears, and form into gr. vj pills.

Franks' Specific Solution.—Rub equal parts of copaiba and liquor potassæ together, when they form a clear mixture, dilute with water, eight parts, add nitric ether half a part, mix and decant off the clear fluid. *Dose.*—fʒj diluted in water.

Oleum Copaibæ, E. *Oil of Copaiba.*

Preparation.—Copaiba ℥j, water Oiss, distil, and when most of the water has passed over, heat it, return it to the still, and resume the distilling which is continued as long as oil passes over.

This essential oil is colourless, of an acrid taste, and has a strong odour of the balsam; it dissolves in ether or spirit of wine, its composition is $C^{10}H_8$. *Dose.*—Gtt x to xx, as a substitute for copaiba.

ROSACEÆ. *The Roses.*—Herbs, shrubs, or trees, leaves alternate, usually compound, and with conspicuous stipules; flowers showy and often terminal; calyx permanent, lined with a disk; petals equal; stamens in general indefinite; carpels solitary, several, united, or separate; styles obliquely inserted on the ovary; fruit various, no albumen, embryo strait. It is divided into SUB-ORDERS, as the Amygdaleæ, Dryadeæ, Roseæ, and Pomaceæ.

Amygdaleæ, having a single, free ovary, which forms a drupe, with a fleshy or fibrous sarcocarp, containing a hard, bony nut, and usually one-seeded; they yield prussic acid from the kernels and leaves when distilled with water, and gum often exudes from their stems.

AMYGDALUS COMMUNIS, D. L. E. *Almond Tree.*

A small tree, leaves lanceolate, acutely serrate, folded flat when young, petiole glandular; flowers nearly sessile, appearing before the leaves; calyx campanulate; fruit a dry drupe, ovoid, woolly outside, when ripe bursting irregularly, within is the shell enclosing the almond.

De Candolle describes several varieties which may be divided into sweet and bitter almonds; of the former, the best or Jordon almonds, come from Malaga; they have a clear brown cuticle; those from Valentia are smaller, and have a dusty brown integument. Barbary and Italian almonds are the smallest and cheapest kinds; for use they are blanched by immersion in boiling water until the cuticle swells, it is then detached, leaving two large white cotyledons. Analyzed by Boullay, 100 parts gave 54 of fixed oil, 24 of emulsin, (a form of vegetable albumen, soluble in cold water, and with the oil, producing almond milk,) 6 of liquid sugar, 3 of gum, 12·5 of water, woody fibre, acetic acid, loss, and seed-coats 5. By expression they yield sweet oil of almonds; this is oftener obtained from bitter almonds, which are cheaper; the residue termed almond cake, is sold in powder for washing hands.

Confectio Amygdalæ, L. *Conserva Amygdalarum*, E. *Almond Confection.*

Preparation.—Sweet Almonds ℥viij, macerate in cold water to remove the skins, and beat with powdered gum arabic ℥j, sugar ℥iv, until incorporated.

" It may be longer preserved if the ingredients are separately powdered and then mixed; when it is used beat all together until incorporated, L."

Used to make the emulsion; it might be easily dispensed with.

Mistura Amygdalæ, D. L. *Mistura Amygdalarum*, E. *Almond Mixture.*

Preparation.— D. Sweet almond ʒv, steep in hot water for five minutes, and remove their outer coats, beat them with refined sugar ʒij, gum arabic in powder ʒj, in a mortar into a coarse powder; add gradually water f℥viij, triturate to form a uniform mixture, and strain through muslin.

L. Almond confection ℥iiss, gradually mix with water Oj, and strain through linen.

E. Almond confection ℥ij, water Oij, mix and strain through linen or calico.

The D. form is preferable, as the confection is liable to change by keeping; the mixture is similar to milk in composition, containing oil in emulsion with albumen and sugar. It is used as a drink in inflammatory affections, and as a vehicle for other remedies, as liquor potassæ, nitre, prussic acid, &c.

Oleum Amygdalæ, L. *Almond Oil.*

Obtained by expressing sweet or bitter almonds, one cwt. yields from O,48 to O,52 of oil, it is pale yellow, nearly inodorous, very liquid, and of a mild oily taste, dens. ·911 to ·920, it dissolves in 6 parts of boiling, or 25 of cold alcohol; in commerce it is often sold adulterated with other nut oils. Taken internally, like all fixed oils, it acts as a mild laxative in full doses, and is sometimes employed mixed with mucilage and water, as a substitute for the emulsion; even if made with care, it imperfectly supplies its place.

The bitter almond is brought from Mogadore, it is without smell or taste until mixed with water, when its peculiar odour is evolved; its chief use is to afford sweet oil of almonds, when expressed; like common almonds they contain gum, sugar and emulsin; they have also a peculiar constituent amygdalin, consisting of $C_{40}H_{27}NO_{22}$: this is white, crystalline, and free from perfume; Liebig obtained about ℥j of it from ℔iv of the almonds; it and the emulsin are contained in distinct cells in the nut, when mixed with water both dissolve, the amygdalin decomposes forming essential oil of almonds, and the emulsin cogulates and perhaps is also changed. In commerce this oil is got by mixing the cake, left after expressing the sweet oil from bitter almonds, with water, and distilling after some hours.

The Essential Oil of Bitter Almonds was supposed to be a constituent in the almond, it is now known invariably to result from the action of water on amygdalin and emulsin; at the same time other products form, and Liebig gives the following table of these reactions, considering amygdalin as alone decomposed.

$$\left.\begin{array}{llll}
\text{2 Equivalents of volatile oil} & C_{28} & H_{12} & O_{4} \\
\text{1 Eq: Sugar} & C_{6} & H_{5} & O_{5} \\
\text{2 Eq: Formic Acid} & C_{4} & H_{2} & O_{6} \\
\text{7 Eq: Water} & & H_{7} & O_{7} \\
\text{1 Eq: Prussic Acid} & C_{2} & H & N
\end{array}\right\} = \text{1 Eq: Amygdalin } C_{40}H_{27}O_{22}N.$$

The essential oil is amber yellow, transparent, of a powerful, agreeable odour, and acrid bitter taste; dens. 1 083; as sold it is highly poisonous, containing from 8·5 to 14 3 per cent. of prussic acid, or four to seven times stronger than the medicinal acid; by distilling it with water, chloride of iron, and lime, this is removed, and the oil can be got colourless, of dens. 1043; its composition is $C_{14}H_{6}O_{2}$; it is considered to be the hydruret of an organic radicle, benzule; there is reason to suppose that when pure it is not very active, though Liebig states that it still continues poisonous; exposed to the air it absorbs oxygen, becoming benzoic acid, and other deposits form in this oil when long kept.

EFFECTS.—It destroys life in the same manner as prussic acid, by which its deleterious action is really produced; f℥ij have killed almost instantly; and after death its strong odour gives evidence of its presence. A solution of f℥j of the oil in spirit of wine f℥vij, is sold as essence of ratafia, or almond flavour; it is dangerous in ignorant hands, as its strength varies from one-fourth, to the same strength as pharmacopœial prussic acid. From its variableness the oil is unfit for medical use, and ought only to be employed as a perfume.

Antidotes.—Like hydrocyanic acid; cold affusion should be applied, and the poison discharged by the stomach pump.

PRUNUS DOMESTICA, D. L. E. *The Plum Tree.*

A small tree with small smooth branches and elliptical leaves; flower-buds of one or two flowers, petals white; drupe fleshy, nut smooth, acute on both sides. Many varieties are cultivated over Europe; it is probably a native of Asia.

When dried by the sun or in ovens, its fruit forms the prune or French plum; the table plum is got from the larger varieties, the medicinal prune from the small black Damascus plum, and principally imported from Bordeaux; they are laxative like all dried fruit, and are used as a vehicle for more active remedies, as in the confection of senna.

CERASUS LAURO-CERASUS, D. *Cherry Laurel.*

A smooth evergreen, leaves with short petioles, oblong acuminate, slightly serrate, shining, with two or four glands on the lower surface, and coriaceous; racemes axillary, petals white and spreading; fruit black, the size of a small cherry. By E. it is termed Prunus Lauro-Cerasus.

This is a native of Asia Minor, about Trebizond, now common in every shrubbery; the leaves have little smell until bruised, when they give out a strong, bitter almond flavour, which is probably produced like the essential oil of almonds. Christison states that 1000 parts of the buds and unexpanded leaves, give 6·33 of the oil during May and June; this sinks to 3·1 in July, and in the May following, from leaves one year old, he got only ·6. Schrader has found 7·6 per cent. of prussic acid in this oil, and Gœppert detected only 2·7. The leaves are used for—

Aqua Lauro Cerasi, D. E. *Laurel Water.*

Preparation.—D. Fresh laurel leaves ℔j, water Oiiss, chop and crush the leaves in a mortar, macerate them with the water for twenty-four hours, and distil off Oj, using a Liebig's condenser and chloride of zinc bath. Filter the product through paper, and keep in a well stopped bottle.

E. Prepared as D, chop the leaves, distil them, filter if any milkiness remains after a few seconds of rest, and add compound spirit of lavender f℥j.

Its strength varies according to the age of the leaves and the length of time the water is kept; a strong laurel water has even proved fatal, with the same symptoms as prussic acid, but in general it affords only a quarter of a grain per cent. of this acid; the spirit of lavender is added as a colouring matter by E. It is is used for flavoring mixtures, and has been employed as a sedative in phthysis, spasmodic cough, and other diseases in which the hydrocyanic acid is prescribed. *Dose.*—f℥ss to f℥ij.

Dryadeæ—Distinguished by having superior, numerous, indehiscent carpels; it includes the strawberry, raspberry, and tormentil.

POTENTILLA, L. E. *Tormentil.*

Root large, irregular and perennial; stem slender, spreading, often procumbent; leaves sessile, or on short stalks, ternate, the lower ones quinate, on long petioles, leaflets oblong acute, serrate, and a little hairy; flowers yellow; calyx four or five-cleft, with as many bracts; petals four or five; stamens many; fruit consisting of small nuts on a flat, dry receptacle.

It is common on heaths and meadows; the root which is used, is large, irregular, dark reddish brown outside, and flesh coloured within; it contains 17·4 per cent of tannin, with colouring, gum, and volatile oil; it is therefore astringent, but seldom used unless as a constituent of compound chalk powder.

Decoctum Tormentillæ, L *Decoction of Tormentil.*

Preparation.—Tormentil bruised ℥ij, distilled water Oiss, boil down to Oj, and strain. Sometimes given in diarrhœa, and as an astringent lotion or injection. *Dose.*—f℥j to ij.

Roseæ Distinguished by having the calyx tube covering the achenia with a false pericarp.

ROSA CANINA. L. E. *Dog Rose.*

A variable species, several of its varieties having distinct names; the stem has scattered, hooked prickles, dilated at the base; leaves naked or slightly hairy, leaflets irregularly serrate; flowers red, sepals deciduous; fruit scarlet.

The fruit or hip is oval, it is the inferior part of the calyx becoming juicy and scarlet; within it are the true fruits, which are numerous hard achenia, surrounded by fine hairs; these must be removed as they are irritating, and act like cowhage; the pulp consists of gum, sugar, citric and malic acids, a little volatile oil, tannin, and salts.

Confectio Rosæ, Caninæ, L. *Conserva Rosæ Fructus,* E.
Conserve of Dog Rose, or of Hips.

Preparation.—L. Pulp of dog rose ℔j, gently heat it in an earthen vessel, gradually add sugar powdered ℥xx, and rub together until thoroughly mixed.

E. Take hips, carefully deprived of their carpels, and beat them into a fine pulp, adding thrice their weight of sugar.

This is used for a vehicle for other substances, its taste is agreeable and acidulous; slight frost is considered to improve the flavour of the fruit.

ROSA GALLICA, D. L. E. *Red or French Rose.*

A small shrub, prickles numerous, equal, mixed with glandular hairs; leaflets stiff, rugose; flowers several together, large, with leafy bracts.

It is a native of the South of Europe, cultivated in Kent for medical use; the flower buds are collected when they are the size of a small nutmeg and unexpanded, the calyx twisted off, and the pale claws of the petals removed, they are then dried in a stove and sifted to separate the stamens and dirt; afterwards they should be preserved in the dark, a tin vessel being perhaps the best to keep them in; 100℔ of fresh petals yield about ℔x of dry leaves, which have a velvetty appearance, are purplish red, and with an agreeable odour developed during drying; their taste is rather bitter, and as they contain tannin they have some astringency; in medicine they are employed for colouring, which is extracted by boiling water—of a pale yellowish hue, becoming bright red on the addition of an acid.

Infusum Rosæ Acidum, D. *Infusum Rosæ Compositum,* L. *Infusum Rosæ,* E. *Infusion of Roses.*

Preparation.—D. Petals of the gallic rose dried ʒij, boiling water Oss, infuse for one hour, strain off about f℥viij, and add dilute sulphuric acid fʒj.

L. Rose petals ʒiij, add in a glass vessel boiling water Oj, then mix dilute sulphuric acid fʒiss, macerate for six hours, strain and add sugar ʒvj.

E. as L., infuse the petals for four hours in a glass or porcelain vessel, not glazed with lead, add the acid, strain through linen or calico, and dissolve the sugar in it.

A mild astringent, used mostly as a vehicle for other remedies, as Epsom salts, the taste of which it disguises; with quinine, it forms a whitish mixture from the tannin contained in the roses; and it should be remembered that all alkalies turn this infusion green, that iron renders it olive brown, and that above all, acetate of lead must not be given with it, as the sulphuric acid would form useless sulphate of lead. In gargles alum or capsicum are often combined with it. *Dose.*—f℥j to ij.

Confectio Rosæ, D. *Confectio Rosæ Gallicæ,* L. *Conserva Rosæ,* E. *Conserve of Roses.*

Preparation.—D. Dried rose petals ℥j, rose water f℥ij, macerate for two hours, add sugar ℥viij gradually and beat into an uniform mass. Or take fresh petals ℥iij, rub in a mortar, add the sugar ℥viij and mix intimately.

L. Petals of rosa gallica ℔j, beat in a stone mortar, add sugar ℔iij, and beat until thoroughly mixed.

E. Beat the petals into a pulp, and gradually add thrice their weight of white sugar.

Used—To form pill masses, as it does not candy or harden.

Mel Rosæ, L. E. *Honey of Roses.*

Preparation.—Petals of rosa gallica dried ℥iv, boiling water Oiss, macerate for six hours, add honey ℔v to the strained liquid, and evaporate to a proper consistence in a water bath, removing the scum.

Used—As a mild astringent in gargles, and sometimes applied alone, or mixed with alum or catechu, to aphthous sore throats.

Syrupus Rosæ Gallicæ, D. E. *Syrup of Roses.*

Preparation.—D. Petals of the gallic rose dried ℥ij, boiling water Oj, boil in a glass or porcelain vessel until their colour is completely extracted; strain with expression, let the sediment subside, decant off the clear liquor, add twice its weight of sugar, and dissolve with a steam or water heat.

E. Dried rose petals ℥ij, boiling water Oj, pure sugar ℥xx, make as the syrups of the damask rose.

Used—For the same purpose as the mel rosæ.

ROSA CENTIFOLIA, D. L. E.

The Hundred-leaved or Cabbage Rose.

Many varieties are cultivated, it forms a bush with erect shoots, thickly covered with strait prickles, scarcely dilated at the base; leaflets glandular at the margin; flowers several together, drooping; sepals spreading during flowering; calyces and peduncle fragrant.

This is also cultivated in Kent, its native locality is Asia, where it yields otto of roses; the petals should be gathered when full blown, and dried gradually in the air; they contain a sweet substance on which their slight laxative effects may depend, and are used for the following preparations.

Aqua Rosæ, D. L. E. *Rose Water.*

Preparation.—D. Essential oil of roses twenty minims, distilled water cong. ss, mix with agitation, and filter through paper.

L. Petals of rosa centifolia ℔x, proof spirit f℥vij, water cong. ij; distil cong. j.

E. as L., Using rectified spirit f℥iij instead of proof; the fresh petals are preferred, but also answer well if preserved by beating them with twice their weight of muriate of soda.

The spirit L. E. is objectionable, as it is insufficient to preserve the water, and more would unfit it for medical use. Rose water should be kept in moderate sized bottles in a cool place; it it employed for its odour in lotions, &c.

Oleum Rosæ, D. E. *Otto of Roses,* imported from India and the Levant; 100,000 roses yield about 180 grains of otto, it is colourless or yellow, and consists of two oils, one of which is solid, the other liquid at ordinary temperatures, and soluble in alcohol; below 80° the entire becomes solid; its only use is as a perfume.

Syrupus Rosæ, L. *Syrupus Rosæ Centifoliæ*, E.
Syrup of the Damask Rose.

Preparation.—L. Dried petals of rosa centifolia ℥vij, boiling water Oiij, macerate for twelve hours, strain, evaporate in a water bath to Oij, and add sugar, ℔vj.

E. Fresh petals of the damask rose ℔j, boiling water Oiij, macerate for twelve hours, strain, add sugar ℔iij, dissolve by the aid of heat, and strain.

Used—For children, being slightly laxative; it is seldom properly prepared. *Dose.*—f℥j, to iij.

Pomaceæ.—Their leaves are usually simple, the tube of calyx adheres to the ovary, and finally forms a fleshy fruit or pome, which is crowned by the limb of the calyx.

CYDONIA VULGARIS, L. E. *The Quince.*

A small, crooked, branched tree; leaves ovate, obtuse at the base, entire, downy on their under surface; flowers few, white or rose coloured, in a kind of umbel; pomes of varying shape, five celled, many seeded.

It grows in the south of Europe, flowering in May and June; the fruit is yellow, downy and of a fine odour; the seeds alone are used in medicine, they are oblong, pointed, flat on one side and convex on the other, their outer coat is composed of condensed mucilage, which according to Bischoff is lodged in cells; it dissolves in water forming a thick fluid.

Decoctum Cydoniæ, L. *Quince Seed Mucilage.*

Preparation.—Quince seeds ʒij, distilled water Oj, boil with gentle heat for ten minutes and strain.

Sometimes employed as a mucilaginous application to erysipelas, painful hœmorrhoids, &c., and hair-dressers use a perfumed, strong decoction, under the name of bandoline.

BRAYERA ANTIDYSENTERICA, or KOUSSO.

A tree about twenty feet high, branches round, downy, marked by annular cicatrices of the fallen leaves; leaves alternate, impari-pinnate, sheathing at the base, leaflets serrated; flowers small, diœcious, in bunches, greenish coloured becoming purple; the male has the carpels well developed, the female has a larger outer layer of calyx, no petals, and sterile stamens; fruit unkown.

This is a native of Abyssinia; the flowers are collected before the seeds ripen and dried in the sun, their odour is compared to a mixture of tea, hops, and senna, their taste is bitterish and rather nauseous; they have been long used in Abyssinia as a remedy for tape worm, and were proposed about thirty years ago by Dr. Brayer, a French physician, residing in Constantinople, as a remedy yet unknown in Europe. Lately they have been re-introduced, and Dr. Budd of London administered them in several instances with success; each dose of the powder weighing ʒivss, is sold in a stoppered bottle at a very dear rate. A purgative is first given to free the bowels of mucus, &c., then the kousso next morning fasting, and it is better to use another purgative a few hours after, to facilitate the expulsion of the worm, which is usually dead, or very weak. Kousso contains tannin, a peculiar bitter acrid resin, and a very little aromatic oil; it has been adulterated with pomegranite bark in powder, the only method of avoiding which, is by purchasing the flowers of the kousso entire.

MYRTACEÆ. *The Myrtle Tribe.*—Trees or shrubs, leaves usually opposite, with transparent dots, and often with a vein running parallel to their margin; calyx four or five cleft, adherent by its tube to the ovary; petals arising from the throat of calyx, equal in number to its divisions, stamens many, anthers ovate, small; ovary many celled; fruit dry or fleshy, seeds strait, without albumen.

MELALEUCA CAJEPUTI. D. M: MINOR, L. E.

Cajeput Tree.

A small tree with a thick soft bark, branches scattered, often drooping; leaves alternate, lanceolate, three to five nerved, silky while young, and aromatic if bruised; spikes terminal and from the extreme axils, downy when flowering, there is a scaly bud at the apex, which afterwards becomes a leafy branch; bracts solitary three-flowered; corolla white; stamens thirty or forty in five bundles, anthers with a yellow gland at the apex; ovary ovate, three celled.

It is a native of the Moluccas, and now grown through India, the volatile oil is got from the leaves collected on a warm day and placed in a sack, they become heated and moist, are then cut, macerated in water for a night and distilled; two sackfuls yielding about fʒiij of oil.

The essential oil is clear, of light green colour and a volatile penetrating odour, like camphor and cardamoms mixed together; its taste is aromatic and afterwards cool; its dens. from ·914 to ·927; it is soluble in alcohol; when carefully distilled the first portions that pass over are colourless, afterwards a heavy greenish oil is obtained, its composition is $C_{10}H_9O$. Its tint has been ascribed to adulteration with copper, traces of which have sometimes been detected in the oil, though it is usually free from this and every other impurity; in 1831 when it was much used for cholera, it became so scarce that oil of rosemary and of cardamoms, with camphor, was sold for it, coloured with parsley leaves.

USES.—Cajeput oil is a powerful diffusible stimulant; Pereira considers its properties between those of valerian and camphor, he states that in large doses it does not disorder the mental faculties as these medicines. It is seldom used, but deserves greater attention as a remedy for flatulent colic, low fevers &c.; and on the continent it is employed in many nervous diseases. Applied in liniments it strongly stimulates, and is made use of in chronic rheumatism, and local paralysis.

DOSE.—Gtt ij to vj, rubbed with sugar, or in emulsion.

CARYOPHYLLUS AROMATICUS, D. L. E.

The Clove Tree.

An evergreen with hard wood and smooth bark; leaves opposite, ovate lanceolate, tapering at both ends; dotted with glands; panicles short, calyx short with a cylindrical tube, limb four parted; petals four, overlapping each other and globular when in bud; stamens in four bundles; ovary two-celled, with many ovules; fruit a large berry with a single seed when ripe, the other cell and ovules having atrophied.

The clove tree is a native of the Mollucas, and the Dutch endeavoured by destroying all the trees elsewhere, to confine it to the Isles of Amboyna and Ternate, it is now grown in the Isle of France, India, and Guiana. Cloves are the unexpanded flower-buds, which are picked or beaten from the tree by long rods, and quickly dried in the shade; when good they should be dark brown, large, heavy, having a strong odour and hot acrid taste, and when pressed yielding oil; they contain in 100 parts, volatile oil 18, a form of tannin 13, gum 13, lignin 28, tasteless resin 6, extractive 4, water 18.

USES.—To cover the taste of other remedies, or to prepare the oil.

Infusum Caryophylli, D. L. E. *Infusion of Cloves.*

Preparation.—D. Cloves bruised ʒij, boiling water f℥ix, infuse for one hour and strain off about f℥viij.

L. E. Cloves bruised ʒiij, boiling water Oj, infuse for two hours, and strain.

Used as an aromatic stimulant in dyspepsia and gout, usually with other remedies. *Dose.*—f℥ij or upwards.

Oleum Caryophylli, D. L. E. *Oil of Cloves.*

Is imported from Amboyna, and also prepared in England by macerating cloves in water, distilling them repeatedly, and separating the oil from the water that comes over at the same time; good cloves yield seventeen to twenty-two per cent of colourless oil, by keeping it becomes yellow or brownish red, its taste is fiery and acrid, and its odour like the clove; it is heavier than water, and it consists of two oils, one light, composed of $C_{10}H_8$ like turpentine, the other heavy, stated to yield $C_{24}H_{15}O_5$, this is acid and combines with alkalies. Clove oil dissolve in alcohol and ether; it is used as an addition to purgative pills to prevent griping, and often placed on cotton in hollow teeth to relieve tooth-ache. An essence of cloves is made by dissolving fʒj of the oil in fʒvij of rectified spirit, and employed by confectioners for flavouring.

Tincture of Cloves. Pereira.—Cloves ℥j, rectified spirit f℥iv, macerate for seven days and filter. A useful adjunct to mixtures in doses of gtt x to fʒj.

EUGENIA PIMENTA, D. L. E, *The Allspice Tree.*

An evergreen tree, leaves oblong with pellucid dots, and smooth; flowers in panicles, calyx and corolla each four cleft, petals greenish white; berry smooth, succulent, of dark purple colour, one, rarely two-celled, two seeded, cotyledons consolidated.

It is cultivated in the West Indies in avenues, its fruit is gathered when green, and dried in the sun; the berries are brown, rough, about the size of a pepper corn, with the segments of the calyx on their tops, and consist of a brittle pericarp and two dark brown seeds within it; their odour is well known, its fragrance depends on volatile oil, of which the husk contains about double the quantity in the seeds. In medicine, allspice is seldom used; its effects are similar to other spices.

Oleum Pimentæ, D. L. E. *Oil of Pimenta.*

Prepared.—By distilling bruised allspice with water; Pereira states, that it consists of two oils, a light hydrocarbon and heavy acid oil, like cloves, the light oil is most volatile, and distils over first. Its effects are similar to other essential oils.

Essentia Pimentæ, D. *Spiritus Pimentæ,* L. E. *Spirit of Pimenta.*

Preparation.—D. Oil of pimenta f℥j, rectified spirit f℥ix, mix.

L. Pimenta bruised ℥iiss, proof spirit cong. j, water Oj, distil as spirit of nutmeg.

E. Prepare as spirit of caraway, using bruised pimenta ℔ss.

Employed to prepare the water, and added to other remedies for flavouring. *Dose.*—fʒj to ij.

Aqua Pimentæ, D. L. E. *Pimenta Water.*

Preparation.—D. Essence of pimenta f℥j, distilled water cong. ss, mix with agitation and filter through paper.

L. Pimenta bruised ℔j, (or oil of pimenta ʒij,) proof spirit f℥vij, water cong. ij; distil cong. j.

E. Pimenta bruised ℔j, rectified spirit f℥iij, water cong. ij; distil cong. j.

Used as a vehicle for other remedies. *Dose.*—f℥j to ij.

Eucalyptus Resinifera. *Botany Bay Kino.*

It is a native of Australia and Van Diemen's Land, it yields much juice on incision, which dries into odourless masses, these are almost black, and in small pieces ruby red and translucent, though sometimes opaque from impurities; in cold water or rectified spirit it swells and forms a gelatinous paste and a red solution, which is astringent and employed occasionally instead of kino.

GRANATEÆ. *The Pomegranite Tribe.*—This is often included in the Myrtaceæ, it is distinguished by its leaves not being dotted, by the want of a marginate vein, the peculiar fruit, the seed involved in pulp, and its cotyledons convoluted.

PUNICA GRANATUM, D. L. E. *The Pomegranite.*

A small tree, leaves lanceolate, smooth, on short stalks; flowers commonly solitary; calyx thick; petals crumpled, scarlet; stamens many; fruit the size of an orange, with a leathery rind, crowned by the calyx, having several cells, divided by a transverse dissepiment into three lower, and five to nine upper cells, each with many seeds.

The rind of the pomegranite fruit forms irregular, dry, odourless pieces, reddish brown and smooth outside, and yellow within; it is very astringent, containing eighteen per cent of tannin, in medicine it is rarely prescribed, but might be used in decoction like other vegetable astringents in doses of f℥ss to ℥ij.

The bark of the root is sold in strips of greyish colour externally, and yellow on the inner surface, brittle, astringent, not bitter, and tinging the saliva yellowish; it was employed by the ancients as an anthelmintic, and has been re-introduced some years since as a remedy for tape-worm. It is sometimes adulterated with box, or barberry bark, the box is distinguished by being white, bitter, and not astringent, and barberry is yellow and very bitter. In employing it, a decoction of fresh bruised bark ℥ij, in water Oij, boiled down to Oj, may be given in doses of f℥ij every half hour, until all is taken, and it is usual to prescribe some aperient as castor oil, before or after it; the difficulty of getting fresh bark in this country interferes with its use.

CUCURBITACEÆ. *The Gourds.*—Annuals or perennials, climbing with tendrils, leaves palmate or with palmate ribs covered with asperities; flowers usually unisexual; calyx five-toothed; corolla five-parted, with reticulated veins, hardly distinguishable from the calyx; male with five stamens, distinct or in three parcels, anthers sinuous; female, ovary three to five celled, with parietal placentas, stigmas thick; fruit often fleshy, seeds flat in an aril, no albumen.

CUCUMIS COLOCYNTHIS, D. L. E.
Colocynth or Bitter Cucumber.

An annual with creeping rough stems, leaves many lobed, hairy beneath, petioles as long as the leaf, tendrils short; flowers single, axillary, yellow with greenish veins; fruit globose, the size of an orange, with a thick hard rind and very bitter pulp.

This plant grows from Turkey to the Cape of Good Hope, and from Spain as far as the south of India ; a small quantity of it is imported unpeeled, from Mogadore, for druggists show bottles, this is larger than the peeled or Turkey colocynth brought from the Levant and Spain ; it is in light porous balls of white or grey colour, containing about three-fourths of their weight of seeds, which are removed before employing it ; the pulp is difficult to powder, it is usually dipped in weak mucilage of tragacanth, and well dried to render it easier to pulverize. Meissner states, that it contains bitter matter or colocynthine 14·4, bitter fixed oil 4·2, resin 13·2, extractive 17· gum and bassorin 12·5, lignin 19·2, salts, water, &c, 19·5 ; colocynthine is a resinous matter soluble in alcohol, it is yellowish brown, brittle, and contains some nitrogen. According to Thunberg, pickled colocynth is eaten at the Cape, although very bitter ; at Algoa bay, it is said not to be so, and a medical gentleman from the Isle of France, informed me that while young it is free from taste there, and used as a vegetable, but when old becomes extremely disagreeable.

USES.—In small doses, it increases the vermicular motion and secretions of the intestines, chiefly acting on the colon ; full doses operate as a drastic cathartic, causing violent purging and griping, and by producing gastro enteric inflammation, a teaspoonful and a half of its powder has proved fatal. It resembles gamboge in its effects, and being also absorbed, besides acting locally as an irritant, it has some diuretic properties. Colocynth is prescribed in general with other purgative remedies, in affections requiring such treatment, as for habitual constipation, obstructed hernias, cerebral diseases, &c. and it has been occasionally employed in dropsies, for which in combination with jalap and gamboge, it is a popular remedy in this country with the lower orders.

DOSE.—Gr. iij to x, seldom given alone.

Extractum Colocynthidis, L. E. *Extract of Colocynth.*

Preparation.—L. Colocynth pulp cut in pieces ℔j, water cong. ij, mix and boil with a slow fire for six hours, adding water as it boils away; strain while hot, and evaporate to a proper consistence.

E. Prepared as L. evaporating by means of a vapour bath.

The pulp yields forty-five to sixty-five per cent of extract, which is seldom employed unless with other cathartics. *Dose.*—Gr. v to x.

Extractum Colocynthidis Compositum, L. *Compound Extract of Colocynth.*

Preparation.—Colocynth pulp, in pieces ℥vj, proof spirit cong. j, macerate with gentle heat for four days ; strain, add purified extract of aloes ℥xij, powdered scammony ℥iv, soap ℥iij, evaporate to a proper consistence, and towards the end add powdered cardamoms ℥j.

If well made, this is a certain purgative; but the temptation is great to use inferior scammony or aloes, and even starch and gamboge have been employed to adulterate it. In preparing large quantities, the spirit can be distilled off, and preserved for common purposes; from the liability of this extract to vary in strength, it is now disused by D. *Dose.*— Gr. v to x often prescribed with blue pill or calomel.

Pilulæ Colocynthidis, E. *Pilulæ Coloc: Compositæ,* D. *Colocynth Pill:*

Preparation.—D. Castile soap ℥j, mix with hepatic aloes powdered ℥ij, pulp of colocynth powdered ℥j, scammony powdered ℥j, and rub all with oil of cloves fʒj, treacle ʒx by weight, into a uniform mass.

E. Socotrine or East Indian aloes, scammony, of each eight parts, sulphate of potash one part; powder, add powdered colocynth four parts, oil of cloves one part, form a pill mass with rectified spirit, and divide into gr. v pills.

It is easier made and more uniform in strength than the extract, though of inferior activity. *Dose.*—Gr. v to x, repeated if necessary.

Pilulæ Colocynthidis et Hyosciami, E. *Colocynth and Henbane Pill.*

Preparation.—Colocynth pill mass two parts, extract of henbane one part, mix well with spirit of wine if necessary, and divide into gr. v pills.

Henbane is added to purgative pills with the intention of diminishing their griping effects. *Dose.*—Of the pill mass gr. v to x.

Enema Colocynthidis, E. *Enema of Colocynth.*

Preparation.—Extract of colocynth ℈ij, soft soap ℥j, water Oj, mix them together.

A good purgative injection, it should be used warm, about the temperature of the body.

ECBALIUM AGRESTE, D.

MOMORDICA ELATERIUM, L. E. *Squirting Cucumber.*

Annual, stem rough, trailing, without tendrils; leaves cordate, somewhat lobed, very rough, on long stalks; males, calyx five-toothed, corolla five parted, stamens five in three bundles; females with three sterile filaments, ovary three-celled; fruit oval, an inch and a half long, green, with soft prickles, when ripe it suddenly bursts from the stalk, and contracting, expels its brown seeds and a slimy fluid through the aperture.

This plant is a native of Southern Europe, and is cultivated in England; elaterium is the fecula deposited from the strained juice of its fruit, and Dr. Clutterbuck found that only the fluid around the seeds contained it, the rest of the plant being inert. English elaterium is in thin, pale green, friable cakes marked by the substance on which it has been dried; it has little odour, and an acrid bitter taste, when exposed to the light it becomes paler; inferior descriptions are dark brown and hard. Maltese elaterium is imported in large pale flakes, and often contains starch and chalk. Alcohol dissolves about half of good elaterium; its active principle elaterine, is crystalline, very bitter, odourless, insoluble in water, and soluble in spirit, operating in doses of the twelfth to the sixteenth of a grain; its quantity varies from five to forty-four per cent in different varieties, the rest consists of green resin, starch, woody fibre, and salts.

Preparation.—D. Take the fruit before it is quite ripe, cut it and express the juice gently through a fine sieve; let the liquid rest until it becomes pretty clear, pour off the supernatant liquor which may be thrown away, and dry the feculence with a gentle heat.

ADULTERATIONS.—Chalk may be known by effervescing with acids, and any starch will give a blue colour with iodine. "Its colour is pale grey; when exhausted with rectified spirit, the concentrated solution poured into hot dilute aqua potassæ deposits on cooling minute, silky, colourless crystals, weighing one-seventh to one-fourth of the elaterium, E." they are elaterine.

USES.—It irritates the mucous membrane of the bowels, and produces copious fluid discharges, hence it is termed a hydragogue cathartic, and employed for dropsies, in which a single dose has sometimes evacuated several pints of fluid; this is often attended with feverishness, quick pulse, and thirst, griping or vomiting; the objections to its use are, that it is liable to cause hyper-catharsis, or even inflammation of the bowels, and when once purging is established in dropsical persons, it may produce dissolution by continuing excessively and beyond control; besides dropsy is too often only a symptom of organic and incurable disease, which being unrelieved will lead to its recurrence.

DOSE.—The sixteenth to the fourth of a grain, in pill or solution, dissolved by rectified spirit or sweet spirits of nitre; sometimes gr. ij or iij have been used; only bad elaterium can be given in such doses with safety, and they should never be ventured on.

UMBELLIFERÆ. *The Umbel-bearing Tribe.*—Herbaceous plants, stems fistular, flowers in umbels; calyx undivided or five-toothed; petals five, often with inflexed points; stamens five; ovary inferior, two-celled, styles two, diverging; disk double, epigynous; fruit consisting of two carpels, termed mericarps, separating from a thin, double, central column, calyx externally marked with longitudinal ridges; seed solitary, pendulous.

CARUM CARUI, D. L. E. *The Caraway.*

Biennial, two feet high, leaves bipinnate, leaflets much cleft, no involucre; calyx margin obsolete, corolla regular, pale flesh coloured, in dense umbels.

The fruit or caraway seed is well known; it contains about five per cent of volatile oil, on which its odour depends; it is employed in medicine as an aromatic addition to other remedies, in the following preparations:—

Oleum Carui, D. L. E. *Oil of Caraway.*

Obtained by distilling the bruised fruit with water; when fresh, it is colourless, and if long kept, becomes yellow. It is added to pills and purgative electuaries to prevent their griping. *Dose.*—Gtt j to vj.

Essentia Carui, D. *Spiritus Carui,* L. E. *Spirit of Caraway.*

Preparation.—D. Oil of caraway f℥j, rectified spirit f℥ix; mix with agitation.

L. Caraway bruised ℥xxij, proof spirit cong. j, water Oij; distil cong. j.

E. Caraway ℔ss, proof spirit Ovij, water Oiss; macerate for two days, and distil Ovij.

Aromatic and stimulant. *Dose.*—fʒj to ij, with other remedies.

Aqua Carui, D. L. *Caraway Water.*

Preparation.—D. Essence of caraway f℥j, distilled water cong. ss; mix and filter.

L. Caraway ℔iss, water cong. ij, proof spirit f℥vij; distil cong. j.

Used as a vehicle for exhibiting more active remedies. *Dose.*—f℥j to ij.

PIMPINELLA ANISUM, D. L. E. *The Anise.*

Stem smooth, one foot high; radical leaves heart shaped, stem leaves biternate, segments linear; umbels on long stalks, no involucre; flowers small, white; calyx obsolete.

The fruit or aniseed is small, ovoid, composed of two greyish green carpels, having five thin primary ridges; its odour is aromatic, and depends on volatile oil, of which it contains three per cent. It is used for flavouring, and being warm and stimulating, is prescribed in the colic and diarrhœa of infants; it is also supposed to aid the secretion of milk, when taken by nurses.

Oleum Anisi, D. L. E. *Oil of Anise.*

Obtained by distilling the fruit with water; when fresh, it is colourless, or slightly yellow, of dens. ·98; at 50° it congeals, and does not again melt until heated to 62°; much of this oil is brought from Germany and from the East Indies; it is asserted to be often adulterated with oil of star anise; the fraud is of little consequence as their effects are similar; it may be known by the latter oil not becoming solid on cooling.

Dose.—Gtt ij to vj, rubbed with sugar or magnesia, and given in emulsion with water.

Essentia Anisi, D. *Spiritus Anisi*, L. *Spirit of Anise.*

Preparation.—D. Oil of anise f℥j, rectified spirit f℥ix; mix with agitation.

L. Anise bruised ℥x, proof spirit cong. j, water Oij; distil cong. j.

The extemporaneous form of D. is preferable. *Dose.*—f℥j or ij added to mixtures, &c.

Aqua Anisi, D. *Anise Water.*

Preparation.—Essence of anise f℥j, distilled water cong. ss; mix and filter. *Dose.*—f℥j or ij, as a vehicle.

FŒNICULUM OFFICINALE, D. E. *Sweet Fennel.*

An annual, stem somewhat compressed at the base; umbels of six to eight rays; flowers yellow; fruit large, some nearly five lines long.

The wild fennel is directed by L., but it is not employed in medicine; the seeds, or more properly the fruits, of sweet fennel, are used; their effects are similar to anise.

Oleum Fœniculi, D. E. *Oil of Fennel.*—Is got by distilling the fruit with water; it is aromatic and stimulant. *Dose.*—Gtt ij to x.

Essentia Fœniculi, D. *Essence of Fennel.*

Preparation.—Oil of fennel f℥j, alcohol f℥ix; mix with agitation.

Used to prepare the water.

Aqua Fœniculi, D. E. *Fennel Water.*

Preparation.—D. Essence of fennel f℥j, distilled water cong. ss; mix and filter through paper.

E. Prepared as aqua anethi.

Used in the colic of infants. *Dose.*—f℥j or ij.

Angelica Archangelica, E. *Angelica.*

Biennial, stem five feet high, hollow; root aromatic; leaves bipinnate, petioles much dilated at the base; umbels terminal, with dense secondary umbels, scarcely any involucre, the secondary involucre of many bracts; carpels with three dorsal, thick keeled ridges, two marginal, dilated into broad wings.

A native of Northern Europe, and cultivated in our gardens; the dried root is imported from Hamburgh for the confectioner, and the seeds were formerly employed in medicine; the whole plant is odorous and considered stimulant.

Opoponax Chironium, L. *Opoponax*.

The gum resin opoponax is produced by a plant like the parsnip, growing in the South of Europe; on incising the root the juice exudes, and concretes into reddish yellow tears; its odour is strong and rather fetid, and its taste is bitter and acrid; it was considered to be antispasmodic, but is seldom used at present.

NARTHEX ASSAFŒTIDA, D.
FERULA ASSAFŒTIDA, L. E. *The Assafœtida Plant.*

A perennial five to eight feet high, root fusiform, with milky fetid juice, leaves in a fasicle above the root, numerous and spreading, about eighteen inches long, of light green colour, paler beneath; stem striated, solid, ending in a large head of compound umbels, no involucre; umbels ten to twenty rayed, partial umbels in round capitula with short rays; flowers small, many of them barren; fruit flattened, with a dilated border, five or six lines long and two or three broad, dorsal ridges three, filiform, lateral ridges obsolete, near the edge; with vittæ.

The plant yielding assafœtida has been imperfectly known for ages, its source is ascribed by L. and E. to the *Ferula Assafœtida*, and it is possible that more than one species may produce it. D. following Dr. Falconer, asserts its origin to be the *Narthex* described above, which grows in Persia and Affghanistan. The gum-resin is got by slicing the top of the root in successive portions, and collecting the exudation as it hardens; it is imported from the Persian Gulf, through Bombay to England, in irregular masses consisting of agglutinated tears; when freshly broken it is milk white or pearly, with a waxy lustre, exposed to the light it soon acquires a pink hue, and gradually changes to a dusky yellow; it is inflammable, has a strong garlic smell which is usually considered disagreeable, and an acrid bitter taste; a fine assafœtida is sometimes imported in tears, or irregular distinct pieces. It is composed, according to Pelletier, of resin 65, gum 19·4, bassorin 11·6, and volatile oil 3·6; when recently exuded it contains more oil, this is colourless when fresh, very volatile, soluble in alcohol or ether, and on it depends the odour of the drug; it has some sulphur as a constituent, which is the cause of assafœtida pills blackening silver leaf; the resin, by exposure to light, changes to a violet hue, and is the source of the colour of assafœtida.

Uses.—Assafœtida is the most powerful of the fetid gum-resins; its local effects are slight, it causes some feeling of heat in the stomach, and eructation; the oil which is its active part, becomes absorbed, and its odour can be perceived in the secretions; it appears to operate on the spinal cord from the diseases in which it is employed, which are convulsive or spasmodic affections, unattended with organic lesions of the nervous centres, as hysteria; for this it is prescribed during the intervals of the attacks, given by the mouth, and administered during its paroxysms with a large purgative enema, which removes any accumulated sordes or flatus, that often are the exciting causes of the disease; from its use in this malady it was considered to act as an emmenagogue; there does not appear to be much foundation for this idea. It has also been given in hooping cough, chorea, chronic catarrh with occasional fits of dyspnœa, epilepsy, &c. and in full doses it is advised by some for spasmodic croup.

DOSE.—Usually stated to be gr. v. to x., and even less is often employed, as gr. i to iij, but to produce its full effects, at least gr. x. to ℈ij should be taken; it may be used in pills or emulsion.

Mistura Assafœtidæ, L. *Assafœtida Mixture.*

Preparation.—Assafœtida ʒv, water Oj, mix, gradually adding the water.

Dose.—f℥ss to f℥ij, for hysteria, and sometimes as an enema in the flatulent colic of children.

Enema Fœtidum, D. E. *Fetid Enema.*

Preparation.—D. Tincture of assafœtida fʒij, warm water f℥xij, mix.

E. Add to the cathartic enema, tincture of assafœtida fʒij.

Used in hysteria, &c.; the quantity of the tincture may be increased to fʒiv in many instances, or ʒij of the gum-resin substituted for it.

Tinctura Assafœtidæ, D. L. E. *Tincture of Assafœtida.*

Preparation.—Assafœtida in small fragments ℥v, rectified spirit Oij, macerate for fourteen days, (seven days, E.,) strain and filter.

Dose.—fʒj to ij; when added to water it becomes milky, the resin precipitating.

Pilulæ Assafœtidæ, E. *Pil. Assaf: Compositæ*, D. *Assafœtida Pills.*

Preparation.—D. Assafœtida ℥ij, galbanum, myrrh, treacle, by weight, of each ℥j, heat them in a capsule with a steam or water bath, and stir until uniformly mixed.

E. Galbanum ʒj, myrrh ℥iss, sagapenum ℥iss, assafœtida ℥ss, syrup enough to form a pill mass; mix.

Effects.—Similar to assafœtida, which might be substituted for it; the D. form is preferable, containing most of the drug, but it should be mixed without heat; it is not purgative. *Dose.*—Gr. v to xx.

Emplastrum Assafœtidæ, E. *Assafœtida Plaster.*

Preparation.—Assafœtida ℥ij, galbanum ℥j, melt together, strain, and add melted litharge plaster ℥ij, bees wax ℥j, and mix thoroughly.

Applied in hooping cough between the shoulders, and over the abdomen in hysteria; its fetid smell more than counterbalances any slight effects it may have.

SAGAPENUM, L. E.

This was known to the ancients, though we are yet unacquainted with its source; it is imported through the Levant, probably from Persia, in agglutinated tears, like galbanum, only darker, or in soft waxy masses; its odour also resembles that substance, and is due to volatile oil of which it consists, with resin; its effects are considered intermediate between assafœtida and galbanum, and the former might be well substituted for it in practice.

DOSE.—gr. x to xxx.

Pilulæ Sagapeni Compositæ, L. *Compound Sagapenum Pills.*

Preparation.—Sagapenum ℥j, aloes ʒss, syrup of ginger enough to form a pill mass, mix. *Dose.*—Gr. v. xx.

OPOIDIA GALBANIFERA, D. E. *Galbanum Plant.*

There is no proof that its source is yet known; L. ascribes it to the *Galbanum Officinale*, which is probably a native of Persia. Galbanum is imported from India and the Levant, in brownish yellow masses, composed of agglutinated tears, mixed with bits of stems and seeds; and at times, fine distinct tears of small size are met; its taste is acrid and bitterish, its odour aromatic and peculiar, like ammoniac with a weak garlic smell; it is easily powdered in the cold, and consists of resin, odorous volatile oil, and gum. Its effects resemble assafœtida; being weaker it is less employed internally, though more used for plasters, as it is not so offensive as the latter substance.

DOSE.—Gr. x to xxv, in pill or emulsion; it is rarely used.

Pilulæ Galbani Compositæ, L. *Compound Galbanum Pill.*

Preparation.—Assafœtida, galbanum, myrrh, of each three parts, conserve of roses four parts; mix into a pill mass.

Uses and composition similar to the assafœtida pill of D. and E.

Emplastrum Galbani, L. *Emplastrum Gummosum,* E. *Galbanum Plaster.*

Preparation.—L. Galbanum ℥viij, common turpentine ʒx, melt, add resin of the spruce fir powdered ℥iij, then lead plaster ℔ij, melted with a slow fire, and mix together.

E. Ammoniac ℥ss, galbanum ℥ss, melt together and strain; melt also litharge plaster ℥iv, bees wax ℥ss, add the gums to this and mix thoroughly.

Used over scrofulous tumours and chronic diseases of joints, as a mild stimulant; these applications are gradually falling into disuse.

DOREMA AMMONIACUM, D. L. E. *Ammoniacum Plant.*

Root perennial, stems nine feet high; leaves large, bipinnate, petioles downy and sheathing; umbels racemose, partial umbels globose, on short stalks, no involucre; flowers white; ovaries woolly, mericarps with three obtuse, filiform, dorsal ridges, and between these, four secondary ones.

The ammoniacum of the ancients was the produce of Cyrene in Africa; the gum resin now used under that name grows in the south of Persia; the plant abounds in milky juice, which exudes from its broken branches; beetles are stated to pierce them, when in perfection about June, and the liquid that escapes is collected after it dries; the finest pieces or tears, as they are termed, of ammoniacum, are roundish lumps, varying from the size of a pin's head to a walnut, yellow or brown coloured, and when freshly broken, white and opalescent; these tears are sometimes agglutinated by a soft brownish exudation, often mixed with impurities, constituting the lump ammoniacum. It is hard, but becomes soft if warmed, has a faint peculiar smell, best perceived when heated, and a nauseous acrid taste, which is rather bitter; it consists, according to Braconnet, of resin 70, gum 18·4, glutinous matter, water, and loss 11·6; others have obtained small quantities of a volatile oil from it; being a gum-resin it dissolves in spirit, and with water forms a milky emulsion.

USES.—It is prescribed in chronic mucous catarrh with excessive secretion, chiefly as a vehicle for more active remedies, as squill or ipecacuhan; its effects are similar, yet weaker than the other fetid gums, and it is usually stated to be stimulant and antispasmodic. Externally it is applied in plasters to tumours and chronic diseases of joints, which it serves by sometimes promoting absorption, from the pressure it exerts, and perhaps by causing slight local irritation, for it often produces a papular eruption.

DOSE.—Gr. x to xxx in emulsion or pills.

Mistura Ammoniaci, D. L. *Lac Ammoniaci, or Ammoniacum Mixture.*

Preparation.—D. Ammoniac ʒij, water f℥viij, gradually mix and strain through calico.

L. Ammoniac ʒv, rub gradually with water Oj, until perfectly mixed.

The suspension of the resin is partial, for much of it subsides after a time; it may be more perfectly mixed by using the yolk of an egg.

Dose.—fʒiv to f℥iss, as a vehicle for expectorants in chronic catarrh.

Emplastrum Ammoniaci, D. L. E. *Ammoniacum Plaster.*

Preparation.—D. Ammoniac in coarse powder ℥iv, proof spirit f℥iv, dissolve with heat, strain and evaporate by a steam or water bath, stirring constantly until it acquires a proper consistence.

L. Ammoniacum ℥v, distilled vinegar f℥viij, dissolve, and evaporate, with a slow fire, to a proper consistence.

E. As L. using vinegar f℥ix, and evaporate over a vapour bath, in an iron vessel.

It forms an adhesive and slightly stimulating plaster applied to chronic swellings and diseased joints, &c., it is more useful in union with mercury, as the *emplastrum ammoniaci cum hydrargyro.*

ANETHUM GRAVEOLENS, L. E. *The Common Dill.*

An annual, one or two feet high, stem striated; leaves tripinnate, segments capillary, leaf-stalks sheathing; no involucre or involucel; flowers yellow; fruit oval, compressed, brownish, a line and a half long, and one line broad, with a paler membranous margin, ridges filiform, the three dorsal acute.

It is a native of the East and of southern Europe, cultivated in England; the seeds are employed; their effects are similar to anise or caraway, and are attributable to an aromatic volatile oil.

Oleum Anethi, E. *Oil of Dill.*—Got by distilling the bruised plant with water; it is pale yellow, of dens. ·881. *Used*—To form aqua anethi, and in doses of gtt ij to vj, mixed with sugar, or in an emulsion, to relieve flatulence and griping in infants.

Aqua Anethi, L. E. *Dill Water.*

Preparation.—L. Dill bruised ℔iss, proof spirit f℥vij, water cong ij, distil cong j.

E. As L. using dill ℥xviij, and rectified spirit f℥iij.

Used for the colic of infants, and as a vehicle for antacids or purgatives.

Cuminum Cyminum, L. E. *The Cumin Plant.*

It is probably a native of Asia, now cultivated in the south of Europe; its seeds or fruits are officinal; they are light brown, and aromatic from containing a volatile oil; their dose is gr. x to xxx; this substance is rarely used, and might well be omitted from the pharmacopœias.

DAUCUS CAROTA, D. L. E. *The Carrot.*

Root the carrot, stem hispid, pinnatisect; calyx five toothed, petals white, except the central flower which is red and neutral; umbels large, flat, becoming hollow from incurvature of the pedicels; fruit brownish, dorsally compressed with bristly primary ridges, secondary ridges winged.

The wild plant has a small woody root, its fruit is officinal in L. but is never made use of; the cultivated root is well known, it contains a ruby red colouring matter, carotin, sugar, albumen and some volatile oil; when boiled and mashed it is employed as a poultice to phagedenic, sloughing, and other foul sores.

CONIUM MACULATUM, D. L. E. *Spotted Hemlock.*

Root biennial, like a young parsnip; stem two to five feet high, round, smooth and hollow, glaucous spotted with purple; leaves large, deep green, on long sheathing furrowed petiole, tripinnate, with lanceolate pinnatifid leaflets; umbels numerous, terminal, of many general as well as partial rays; involucre of three to seven leaflets, involucel of three leaflets on one side; margin of calyx obsolete, petals five, white with inflexed points; stamens five; fruit ovate laterally compressed, carpels with five undulated ridges.

Hemlock grows in waste grounds near towns, over Europe and Eastern Asia, and it has been introduced into North America; in the first year it has a long slender root and a few radical leaves; in the second year it throws up its peculiar spotted stem, by which it may be recognized, as also by the strong mice-like odour of its bruised leaves; and after flowering, by the crenated ridges of the fruit, and its unilateral partial involucels. The plant is usually directed to be gathered when in flower, Dr. Christison however considers that it is more active in the November and March of its first year; the leaves should be quickly dried by a heat not above 120° in stoves, and preserved in closed dry vessels, away from the light, as in tin canisters, and used only when of good quality and exhaling a strong disagreeable smell when rubbed with caustic potash. Conium contains a volatile oil of peculiar odour, which is not poisonous, and an alkaline principle, termed conia, is found in all parts of the plant, particularly the fruit; it is best obtained by distilling an alcoholic extract of the unripe fruit, with water and a little potassa, a colourless oily fluid passes over, having an unpleasant odour resembling mice, it combines with one-fourth its weight of water to form a hydrate, dissolves in alcohol or ether, and produces white fumes with hydrochloric acid; Liebig states its composition is $C_{12}H_{14}NO$. Conia acts as a local irritant, this is soon succeeded by swiftly spreading palsy of the muscles, first of voluntary motion, then the respiratory muscles of the chest and abdomen, and lastly of the diaphragm, causing death by asphyxia from its paralysing effects; it was proposed as an antidote for strychnine, but is not likely to be useful, as it wants a principal requisite, which is, harmlessness in the remedy, so that it may not do more injury than benefit.

Plants liable to be mistaken for Spotted Hemlock.

Æthusa Cynapium.—Fools parsley, is smaller and has not the peculiar odour of conium, it also wants the involucre, its involucel consists of three long unilateral pendulous leaflets, and the fruit is not crenated. This is an active poison, and has proved fatal within an hour after being taken; pain in the abdomen, sickness, spasmodic closure of the jaws and sometimes convulsions occur from its use.

Œnanthe Crocata.—Hemlock water drop-wort grows on the banks of rivers, its stem is channelled and smooth, yellowish red at the joints only, not spotted; its fruit is oblong and black, and its root consists of tubers. Dr. Christison has shewn that in Scotland this plant is far less poisonous than it has proved in England, where it has caused strong convulsions, within twenty minutes after taking it, and death has ensued in less than an hour; being the most dangerous of our indigenous plants.

Phellandrium Aquaticum.—Fine leaved water hemlock, it has a thick hollow stem about three feet high, its leaves are very fine, much subdivided and dark shining green; this plant grows near rivers; it is less dangerous than the œnanthe.

Cicuta Virosa.—Water hemlock inhabits marshy places, its rootstock is hollow and has a disagreeable smell, its stem is thick, smooth and striated, reddish at the branching of the umbels; leaves large, pinnate and tasting like parsley. It causes vertigo, dimness of sight, gastric pain, vomiting, convulsions, and death in a few hours.

EFFECTS.—In poisonous doses conium produces stupor, coma, and convulsions, and in general paralysis of motion. The following case of Dr. Bennett's will illustrate its action; a man eat it through mistake, soon after he lost power over his lower limbs and staggered, at length he fell, when raised up his legs dragged after him, and his arms were powerless; within two hours he lost all motion in his limbs, there was inability of swallowing, slight loss of sensation, but no convulsions; within three hours his breathing ceased, and he died gradually asphyxiated, in a quarter of an hour after.

Hemlock has been used in medicine to disperse chronic enlargements of various kinds, and when foul and painful ulcers arise from such tumours, it is employed to relieve the pain that attends them and promote their cure; formerly it was asserted that cancer could be healed by conium, at present there is little faith given to this statement, although in lupoid and scrofulous indurations and sores which have often been mistaken for cancer, it is found of service. The common preparations of this drug have in general almost no activity, its leaves are ill dried, kept for too long a time, and perhaps gathered at improper seasons or mixed with other plants, and the extract carelessly made, being over heated, which destroys the coneine, or allowed to become covered with mould that rapidly grows on it, or kept until it is quite destroyed by age; fresh observations are therefore wanting to determine its effects, and they must be made with some preparation that is less uncertain than either the extract or the powder, such as well made succus conii. In spasmodic cough, combined with expectorants it is prescribed in phthysis; and while it may not cure, it often alleviates the pain of cancerous ulcers for which it is used in cataplasms, and internally by some practitioners.

DOSE.—Gr. iij to v of the powder, it should be of fine green colour, made from leaves collected the same year, and evolve a strong smell of conia when rubbed with caustic potash; some employ the seeds in powder as a more certain preparation.

Tinctura Conii, L. E. *Tincture of Hemlock.*

Preparation.—L. Hemlock leaves dried ℥v, cardamom seeds bruised ℥j, proof spirit Oij, macerate for fourteen days and strain.

E. Fresh leaves of conium ℥xij, bruise and express the juice strongly; bruise the residue, pack it firmly in a percolator and transmit first, tincture of cardamoms Oss, then rectified spirit Oiss, allowing the spirituous liquor to mix with the expressed juice as they pass through; adding gently enough water to the percolator to push through the spirit in the residuum; filter the liquid after agitation.

Dose.—Gtt xx to xxx. The E. form is preferable, but it might be easier made by adding to a certain quantity of the expressed juice enough rectified spirit to preserve it.

Succus Conii, Preserved juice of Conium.—Express the bruised fresh leaves, let the juice stand for twenty-four hours, decant it from the fecula which subsides, and add rectified spirit f℥iv to every f℥xvj of the juice, and after twenty-four hours filter it from any mucilage that is precipitated.

Dose.—Gtt xv to xxx gradually increased.

Extractum Conii, D. L. E. *Extract of Hemlock.*

Preparation.—D. Prepared from the fresh leaves, collected when the plant begins to flower, and made as extractum belladonnæ.

L. Take the fresh leaves, sprinkled with a little water ℔j, bruise them in a stone mortar, express the juice and evaporate it unstrained, to a proper consistence.

E. Beat the leaves into a pulp in a marble mortar, express and filter the juice, and evaporate it to a firm extract; either in vacuo with the aid of heat, or spontaneously in shallow vessels, exposed to a strong current of air, freed of dust by gauze screens. It is good only when it gives with potash a powerful odour of conia.

Dose.—Gr. ij to v. It is rarely worth being employed; in concentrating it, the coneine is often destroyed, and appears to be converted into ammonia, which escapes during the process.

Pilulæ Conii Compositæ, L. *Compound Hemlock Pills.*

Preparation.—Extract of hemlock ʒv, ipecacuanha powdered ʒj, mucilage of acacia enough to form a pill mass, mix.

Dose.—Gr. v to x, twice or thrice daily in hooping cough, bronchitis, and incipient phthysis.

Cataplasma Conii, L. *Hemlock Poultice.*

Preparation.—Extract of Hemlock ℥ij, water Oj, mix and add powdered linseed, enough to make it of a proper consistence.

Applied to painful ulcers as an anodyne.

CORIANDRUM SATIVUM, D. L. E. *The Coriander.*

Stems annual, one or two feet high, round and smooth; leaves bipinnate, cut; petals white with a pink tinge; fruit globose, carpels with obsolete primary ridges and four prominent secondary ones, keeled.

The coriander is sometimes found wild in England, but is cultivated in Essex for use; its odour depends on a fragrant volatile oil, and its effects are similar to the other aromatic umbelliferous fruits; it is employed by confectioners and distillers, and added to the electuary of senna as a flavoring ingredient.

The Sumbul.

The Sumbul, to which attention has been directed by Dr. Granville from its recent employment in Russia for cholera as a stimulant during collapse, is a thick root of varying form and size, from three to four inches in diameter, yellowish white, and fibrous; it has a strong odour of musk, and a powerful aroma when chewed, resembling angelica; the root is brought through Kiatka to Moscow, its native country is considered by Erdmann to be Bucharia, by others it is thought to be Persia, it probably belongs to the umbelliferæ, and is aquatic, or grows in marshy soils. Reinsch found it to contain traces of volatile oil, resins, wax, and a bitter principle. It is recommended in nervous affections, cramps, spasms, and hysteria. *Dose.*—Gr. x to to ʒj.

EXOGENS. *3rd. Corrolliflorœ.*

Caprifoliaceæ. *The Honeysuckle Tribe.*—Shrubs or herbs, leaves opposite, no stipules; flowers showy and fragrant; calyx four or five cleft, with bracts; corolla various; ovary with one to five cells; fruit indehiscing, one or more celled.

SAMBUCUS NIGRA, L. E. *The Elder Tree.*

Arborescent, stem much, but not always oppositely branched, young branches with spongy pith; leaves pinnate, leaflets usually two pairs with an odd one; cymes large having many cream coloured; flowers; calyx limb five cleft; corolla rotate, five cleft; stamens five; stigmas three, sessile; berry globular, black, three to five seeded.

Almost every part of this plant was considered medicinal; it is now seldom used and might be expunged from the materia medica; the berries contain acid and sugar, they are employed to make elder wine, and a confection of them is stated to be aperient and diuretic; the inner bark is hydragogue and emetic, it was given by Sydenham for some dropsies.

Aqua Sambuci, L. E. *Elder Flower Water.*

Preparation.—L. Elder flowers ℔x, or oil of elder ʒij, proof spirit f℥vij, water cong. ij, mix, and distil cong. j.

E. Elder flowers ℔x, rectified spirit f℥iij, water cong. ij, distil cong. j. Used as a lotion under the idea that it removes freckles; it cannot be made from the oil as directed by L.

Oleum Sambuci, L. *Oil of Elder*.—Directed to be got by distilling the flowers, the product is unfit for medicine. The oil sold under this name in the shops is rape oil, coloured by boiling with elder leaves; it is popularly used as a liniment.

Unguentum Sambuci, L. *Elder Ointment*.

Preparation.—Elder flowers ℔ij, lard ℔ij, boil until the flowers are crisp, and strain through a linen cloth.

A useless form, having no advantages except odour, over plain lard.

CINCHONACEÆ. *The Cinchona Tribe*.—Herbs trees or shrubs, leaves simple, opposite, seldom verticillate, with interpetiolar stipules; inflorescence varied; calyx simple; corolla tubular, regular, valvate, or imbricate; stamens all on the same line, alternate with the lobes of the corolla; ovary surmounted by a disk, ovules numerous or few, fruit dehiscent, or dry and indehiscent, or succulent.

CINCHONA. *Various species yielding Peruvian Bark.*

The history of its discovery is obscure, some attribute the knowledge of its medical properties to the Peruvians, and by some the Jesuits are supposed to have first used it; Condamine states that its name is derived from the Countess of Cinchon, lady of the Viceroy of Peru, who brought its bark to Europe in 1639; afterwards through the agency of the Jesuits it was extensively distributed, and hence became designated Jesuits' bark. The species termed *cinchona officinalis* was once supposed to yield all this drug; additional information was acquired by Mutis, Ruiz, Humboldt, and others, and Dr. Lindley has described twenty-one species, and mentioned five others; Martius has made known three more from Brazil, and Mr. Bentham one from British Guiana.

The true cinchonas are supposed to be confined to the Andes from 20° South, to 11° North of the Equator, at an elevation of 1,200 to 10,000 feet, where the average temperature varies from 59° to 62°. The best barks are got on dry rocky soils at the greatest elevations; the trees are peeled about May, either by cutting them down and then removing the bark, or taking it off as the tree stands; it must be speedily dried, otherwise its value diminishes; the cinchona is then packed in chests and serons, each of which in general contains only one kind of bark, and exported from various parts of South America, as Loxa, Arica, Valparaiso and Lima. All the trees yielding it belong to the following genus.

Genus Cinchona.—Leaves on short petioles, margin plane, stipules foliaceous, deciduous; flowers panicled, white or purple; calyx five toothed, corolla monopetalous; stamens five, filaments short, inserted in the middle of the tube; capsule ovate, furrowed at the side, two celled, splitting *from* below; seeds numerous, girt with a membranous wing.

Pale Bark.—First, Crown or Loxa bark, imported in rolled quills six to fifteen inches long, and from half a line to two lines thick, with a grey epiderm, often having white and ashy lichens on it, and marked by longitudinal and transverse cracks on its surface, inside it is smooth and cinnamon brown; its taste is astringent and bitter. This is chiefly produced by *C: Condaminea,* a tree about eighteen feet high, growing near Loxa; it yields cinchonine and a little quinine, and gives no precipitate of lime on adding sulphate of soda to its infusion.

Secondly, Silver or Grey bark was brought to Spain in 1799; its quills are larger and coarser, but less wrinkled than Loxa bark, varying from the third of a line to five lines thick, its inside is rusty brown, and its fracture even and resinous; this is the produce of *C: Micrantha,* growing in Peru.

Yellow Bark.—Is imported in chests, and serons of ox hide, its source is still unknown, it is stated to be produced in the province of La Paz in Bolivia, in a plain bounded by mountains, and elevated 14, or 15,000 feet above the sea. Quilled cinchona is in pieces of variable length, a quarter of an inch to two inches wide, and from half a line to seven lines thick; its epiderm is grey, fissured, and easily removed; internally it is smooth, fibrous, and cinnamon coloured; its transverse fracture is short and splintery. The Flat Calisaya bark is in pieces from one to three inches broad, usually without epiderm, and more fibrous than quilled bark. It contains much quinine, to obtain which it is imported, it has but little cinchonine, and its infusion gives an abundant deposit of lime with sulphate of soda.

Red Bark.—Was probably known early, but not distinguished as a separate variety until 1702; it is imported from Lima, its source is yet doubtful, and it is supposed to be the *C: Oblongifolia* of Mutis. Red bark is in quills, or oftener in flat or curved pieces, varying from one-fourth to three-fourths of an inch thick, and sometimes two feet long, they have a rough and often warty epiderm of reddish brown colour, to which lichens adhere less frequently than to the other cinchonas; the flat pieces are fibrous internally, of deep colour, and break with an irregular surface; the quills are not so coarse, and have a smooth fracture; this bark is strongly bitter, with a slight aroma; it contains both quinine and cinchonine.

Composition.—Their odour arises from a volatile oil; and most barks contain a variety of tannin, which absorbs oxygen, becoming red insoluble matter, termed red cinchonic by Berzelius, and Pereira considers it analagous to catechine; it precipitates antimonials, but not gelatine unless first dissolved by an alkali, and precipitated with some acid.

Cinchonia.—$C_{20}H_{12}ON$, abounds in pale bark united with kinic acid and red cinchonic matter, in red bark it is found mixed with about an equal quantity of quinine; when pure it is white, soluble in 2,500 parts of cold water, or in hot alcohol, from which it crystallizes on cooling; it is seldom used, unless to adulterate quinine, as a substitute for which it might probably be employed.

Quinine.—$C_{20}H_{12}O_2N$, found in yellow bark, and with cinchonine in red bark; it is obtained by precipitating its sulphate by ammonia; quinine is white, soluble in alcohol, ether, or 200 parts of boiling water, at 300° it fuses into a yellow resinous mass; (see sulphate of quinine.)

Aricine.—$C_{20}H_{12}O_3N$, exists in barks brought from Cusco, it resembles cinchonine; with nitric acid it becomes green, and its sulphate, when evaporated and cooled, forms a jelly which can be dried into a horny mass.

Quiniodine.—Is asserted by Liebig to be amorphous quinine, a sulphate of this substance has been introduced into practice.

ADULTERATIONS.—Inferior barks or those injured by keeping have been sold for good cinchona, and some even after extracting the quinine from it; false barks are also described termed Piton, Caribean, and Pitaya, the latter alone has been met in English commerce, and is rare. The best evidence of the quality of yellow cinchona is its quinine; "a filtered decoction of 100 grains in distilled water f℥ij, gives with concentrated solution of carbonate of soda f℥j, a precipitate which when heated in the fluid, becomes a fused mass, weighing when cold gr. ij, or more, and easily soluble in solution of oxalic acid. E." Guibourt proposes to test the lime in bark, as it is found that those rich in quinine contain most lime; he percolates cinchona powder with water, and then by means of sulphate of soda, precipitates the lime in the clear fluid, as a sulphate. Berzelius stated that the best barks have most tannin, and yield most deposit with persulphate of iron, gelatine, or tartar emetic; this process is adopted in Sweden. In this country pale bark, which has little or no quinine, is employed for making decoctions or infusions, the yellow bark being bought by quinine manufacturers.

USES.—Although given indiscriminately, it is improbable that all cinchonas have similar effects; yellow and crown bark abound in tannin, quinine is mostly contained in yellow bark, which therefore ought to be preferred as an antiperiodic, and we yet know too little of cinchonine to determine its medical properties. Bark may be considered the type of a vegetable tonic, or a drug which administered for a lengthened period is capable of increasing the vigor of digestion and assimilation, and the effect continuing after the medicine is omitted, produces increased strength from the healthy development of tissues; it is possible that this may be produced through their action on the nervous system, and it should be remembered that tonics only operate beneficially when the body is debilitated, and as they have no power in themselves of producing strength, their use demands suitable food, with time for digestion, and for the exhibition of the remedy.

Bark is prescribed during convalescence from acute diseases, in affections attended with profuse chronic discharges, in many surgical maladies, and after operations, when the strength is reduced; for erysipelas it is given in its second stage, and some employ it combined with tartar emetic in the earliest periods of the attack; in scrofulous disorders, as enlarged glands and strumous opthalmia, it is often of benefit; in mortification cinchona was at one time supposed to have special powers, and heaped on the dead part, and into the stomach as if the cure depended on the quantity; it does good so far as its tonic effects reach, and moderate doses will therefore produce all the service of which it is capable; bark has often been recommended in acute rheumatism, but has never got into general use; and is sometimes exhibited towards the end of fevers when there is no inflammatory complication, though it is more frequently advised after the fever has subsided, to aid recovery.

Its anti-periodic effects, or power of checking diseases that occur at regular intervals, is well established, yet its mode of operation is as obscure as the origin of these affections; arsenic has a similar control over them. In ague, bark is considered almost a specific, but the claim of any remedy to such a title is doubtful; it is usually given during the intermissions, when it is considered most efficacious; some assert that in the attack it is injurious, there is no proof that such is the case; it may be prescribed in one large dose a few hours before the attack or in repeated small ones, and ought not to cause purging or vomiting, which would interfere with its constitutional operations; an emetic and purging are however advised before beginning its employment, and quinine is in general preferred to bark at present for this disease; its dose is similarly regulated. Cinchona has been exhibited by the mouth, in enemas, cataplasms, and even sewed into the clothes of children. In other periodic diseases, as intermitting neuralgia, or head-ache, and also in amaurosis, and subacute rheumatism, it has been found beneficial.

DOSE.—Gr. xx to ʒj of powdered bark, rarely given from its bulk, and the quantity of inert woody fibre in it.

Infusum Cinchonæ, D. L. E. *Infusion of Cinchona.*

Preparation.—D. Crown or pale bark in coarse powder ℥j, boiling water Oss, infuse for one hour, and filter off through paper about f℥viij.

L. Lance leaved cinchona bruised ℥j, boiling water Oj, macerate for six hours and strain.

E. Any species of cinchona prescribed ℥j, boiling water Oj, macerate for four hours and strain through calico.

Water dissolves the red cinchonic, kinate of the alkaloids, and lime, but most of the alkaloids remain with insoluble red matter in the wood; the infusion is a light tonic, often given in effervescence with bicarbonate of potash and lemon juice. *Dose.*—f℥j to ij.

Decoctum Cinchonæ, D. L. E. *Decoction of Bark.*

Preparation.—D. Crown or pale bark in coarse powder ℥ss, water Oss, boil for ten minutes and strain off f℥viij, while hot.

E. Crown, grey, yellow, or red cinchona bruised ℥j, water f℥xxiv, boil for ten minutes, when cool, filter, and evaporate to f℥xvj.

L. Directs Cinchona cordifolia, yellow bark; C: lancifolia, pale bark; or C: oblongifolia, red bark; of either bruised ʒx, distilled water Oj, boil for ten minutes and strain while hot.

By boiling, kinates of the alkaloids, lime, colouring, starch and part of the compound of red cinchonic and the alkaloids is extracted, forming a clear brown fluid; as it it cools below 88° nearly half the starch, tannin, and alkaloids with red cinchonic are deposited. Water acidulated with the mineral acids form a stronger decoction, while alkalies give a less active but deeper coloured solution. *Dose.*—f℥j to ij, it is the most useful preparation of bark.

Tinctura Cinchonæ, D. L. E. *Tincture of Bark.*

Preparation.—D. Pale or crown bark in coarse powder ℥viij, proof spirit Oij, macerate for fourteen days, strain, express, and filter.

L. Heart leaved cinchona bruised ℥viij, proof spirit Oij, infuse for fourteen days and strain.

E. Yellow, or any other bark in fine powder ℥iv, proof spirit Oj, moisten the bark with a little spirit, after ten or twelve hours, pack it in the cylinder and percolate the spirit. It may be made more slowly and with greater loss by using coarse powder and digesting.

Dose.—fʒj to iij added to the infusion or decoction; it is a favourite vehicle for corrosive sublimate.

Tinctura Cinchonæ Composita, D. L. E. *Compound Tincture of Bark.*

Preparation.—D. Crown or pale bark in coarse powder ℥iv, orange peel ℥ij, serpentaria bruised ʒvj, saffron chopped fine ʒij, cochineal in powder ʒj, proof spirit Oij, macerate for fourteen days, strain, express, and filter.

L. As D. using lance leaved cinchona, and ℥iij of orange peel.

E. As D. employing yellow bark, and ℥iij of orange peel; macerate for seven days; it may also be made by percolation, using the bark in fine powder.

This is more aromatic, and has less cinchona than the simple tincture; it is commonly termed Huxham's tincture of bark. *Dose.*—fʒj to iij.

Extractum Cinchonæ, L. E. *Extract of Bark.*

Preparation.—E. Take any variety of bark, especially red or yellow, in fine powder ℥iv, percolate with proof spirit f℥xxiv; distil off the greater part of the spirit, and evaporate the residue over a vapor bath to due consistence.

L. Yellow, pale, or red bark ℥xv, boil with water cong. j, down to Ovj, strain while hot, do this four times, mix the liquors and evaporate to an extract.

Dose.—Gr. v to xv; seldom used.

QUINÆ SULPHAS, D. L. E. *Sulphate of Quinine.*

A light white substance forming silky odourless crystals, flexible, and very bitter; composed of $2Qu+SO_3+8Aq$; in the air it loses four atoms (6. Soubeiran) of water, or eight per cent by weight; at 212° it becomes luminous, and melts at 240°, it dissolves in 740 parts of cold, or 30 of boiling water, or 80 of alcohol; its watery solution has a blue tinge.

Preparation.—D. Powdered yellow bark ℔j, water cong. ss, oil of vitriol fʒij, macerate for twenty-four hours, boil for half an hour and decant; boil the residue twice with water cong. ss, and sulphuric acid fʒj. Evaporate the decanted liquids to Oij, filter through calico when cold, and add slacked lime ℥j, or until the solution reacts alkaline; collect the precipitate on calico, wash it with cold water, about Oj, and when partly dried on porous bricks, powerfully express it, enveloped in blotting paper. Put the pressed mass in a flask with rectified spirit Oj, boil it for twenty minutes, and decant, when the insoluble matter subsides; repeat this process thrice, express the undissolved residue, filter the decanted and expressed liquors through paper, and distil them to recover all the spirit. Mix the brown viscid mass remaining, with water f℥xvj, heat it to boiling, and add dilute sulphuric acid f℥ss, or so as to produce a neutral or slightly acid solution; add animal charcoal ℥ss, boil for five minutes, filter, and cool that crystals may form; dry them by mere exposure to the air. The decanted liquid will by concentration yield an additional product.

L. Heart leaved cinchona bruised ℔vij, water cong. vj, sulphuric acid f℥iv ʒij, boil for an hour and strain; boil the residue in as much more acid and water, and finally in water cong. viij, and strain; wash the residue well with boiling water. Mix the liquids, and add moist hydrated oxide of lead, nearly to saturation; pour off the liquor and wash the precipitate with water. Boil down the liquors for a quarter of an hour, strain, add solution of ammonia gradually to precipitate the quina; wash this until nothing alkaline is perceptible, saturate what remains with sulphuric acid f℥ss, diluted; digest it with animal charcoal ℥ij, strain, wash the charcoal thoroughly, and evaporate it with care to form crystals.

E. Yellow bark in coarse powder ℔j, carbonate of soda ℥iv, water Oiv, boil for one hour, strain and press strongly through calico; moisten the residue with water Oiv, sulphuric acid fʒij, strain, express strongly through calico; moisten the residue with water, and twice press it. Boil it then for half an hour with water Oiv, and sulphuric acid fʒij, strain, express strongly, moisten it with water and press again, and boil it twice with waterOiv, and sulphuric acid fʒj, straining and squeezing as before. Concentrate the liquids to Oj; when cool, filter, and dissolve in it carbonate of soda ℥iv; collect the impure quina on a cloth, wash it slightly, and squeeze out the liquor with the hand; break it down in distilled water Oj, add nearly f℈j of sulphuric acid, heat it to 212°, stirring occasionally; should the precipitate remain grey, and the liquid be neutral, add sulphuric acid in drops, stirring constantly until the color disappears; if the fluid reddens litmus, neutralize with carbonate of soda; should crystals form on its surface, add distilled water. Filter through paper, keeping the funnel hot; crystallize, collect and squeeze the crystals; dissolve them in distilled water Oj, at 212°, digest for fifteen minutes with purified animal charcoal ʒij, filter and crystallize, and dry the crystals at a heat not above 140°. The mother liquid will yield more crystals.

By E. soda is first used to extract colouring, gum, &c. all the colleges next direct the bark to be boiled with sulphuric acid which extracts the alkaloids. D. then employs lime, L. oxide of lead, and E. carbonate of soda, which produce sulphate of lime, lead, or soda, and precipitates the quina in the forms of D. and E.; by L. it is deposited from the strained liquid on adding ammonia; it is afterwards dissolved, purified, and converted into a sulphate. Its amount varies from one to three per cent. of the yellow bark.

ADULTERATIONS.—Sulphate of cinchonine is often mixed with it, by stirring the quinine while crystallizing, which deposits both salts; or its crystals are packed in the inside of the bottles, pure sulphate of quinine being placed outside; it is detected by precipitating with caustic soda, and re-dissolving the quinine in ether, when cinchonine is left. Salicine, the principle of the sally tree, is rarely added to quinine, it becomes red with sulphuric acid; sugar is known by its taste when the quinine is precipitated with carbonate of soda; starch or spermaceti are insoluble in cold water; powdered gum is insoluble in alcohol; and any earthy matters will remain on incinerating quinine.

USES.—Similar to bark, over which its advantages are, its small bulk, freedom from inert woody fibre, and definite composition; and its disadvantages are expense, the loss of astringent and aromatic parts, and the waste of cinchonine in making it.

DOSE.—As a tonic, gr. j to iij three or four times daily, in pill, or dissolved by dilute sulphuric acid in mixture, gtt j being added for each grain of quinine. As an anti-periodic for painful affections, gr. v to viij twice or thrice daily, and in ague gr. xv to ℈ij in divided doses during the intermission; lately it has been used in ℈j doses, followed by smaller ones at short intervals to produce a condition termed *quinism*, attended with ringing in the ears, dimness of sight, and diminished sensibility, for ague and yellow fever.

Quinæ Murias, D. *Muriate of Quinine.*

Preparation.—Chloride of barium gr. 123, water f℥ij, melt and mix with sulphate of quina ℥j, dissolved in boiling water f℥xxx; let the solution cool, and dry the crystals on blotting paper. The decanted liquor will on concentration give more crystals.

Dose and effects similar to the sulphate.

Tannate of Quinine.—Got by neutralizing quinine with tannin, and evaporating. Rolander of Stockholm considers it the most active salt of quinine. *Dose*, &c. like the sulphate.

Arseniate of Quinine.—Quina ʒiiss, arsenic acid ʒj, water f℥iv, boil together; on cooling, small white crystals fall, they are collected on a filter and purified by re-crystallizing. *Dose.*—The tenth to the fourth of a grain in a large quantity of water to dissolve it; this has been much recommended in France for agues.

Quinoidin or Amorphous Quinine.—Got from the mother liquids after crystallizing out the quinine, as a substitute for which it has been used.

Uncaria Gambir, D. E. *The Gambir Tree.*

A stout shrub grown in the Indian Archipelago, which yields terra japonica, a variety of catechu, used for tanning, and as a substitute for the acacia catechu; it is got from the leaves by evaporating their strained watery infusion.

CEPHAELIS IPECACUANHA, D. L. E. *Ipecacuan Plant.*

Root perennial, annulated; stem sending out runners, at length erect and downy with four to six leaves, opposite and downy beneath; stipules erect and finely cleft; peduncles solitary, erect when flowering, drooping with the fruit; flowers in heads, with a one-leaved deep cleft involucre, and one bract to each flower; calyx five toothed; corolla funnel shaped; stamens five; berry fleshy, dark violet, two celled and two seeded.

It grows in moist shady places in Brazil; its root is collected principally from January to March, and exported from Rio Janeiro; the pieces are two to five inches long, as thick as a quill, twisted and knotty, like a number of rings on a string; outside is a brittle cortex, and inside a woody meditullum which is tough, nearly inert, and forms about a fifth of its weight; the cortex has a faint nauseous odour, and acrid, rather bitter taste; in 100 parts it has according to Pelletier, emetic extract 16, fat, wax, and gum 18, starch, wood, and loss 66. Ipecacuan contains about one per cent of pure emetine, $C_{35}H_{25}NO_9$, which is white, alkaline, odourless, and slightly bitter; this is seldom employed, its dose is the eighth to the tenth of a grain.

ADULTERATIONS.—On the continent, a striate or black root is sometimes used, produced by the *Psychotria emetica* of New Grenada, which was supposed to be the source of genuine ipecacuan; and a white undulated root having no rings and containing much starch, is also met with; its origin is the *Richardsonia scabra* of Brazil; they both contain some emetic matter.

USES.—Its powder causes dyspnœa, and even asthma ending in profuse expectoration, with some persons. In small repeated doses it acts as a sedative on the bronchial mucous membrane; when congested, promoting its secretions, and if the flow of mucous is excessive, decreasing it and restoring the membrane to a healthy state; in acute bronchitis it is given with greatest benefit in full nauseating doses, and for chronic attacks small ones are generally preferred; with young children, vomiting is well borne and should not be neglected in incipient catarrhs, as with other precautions it will often cut short an attack of croup or bronchitis. For hooping cough it is exhibited so as to cause emesis at first, and afterwards in nauseating doses, with which opium or alkalies may be combined. In asthma an emetic of ipecacuan will sometimes relieve the paroxysm, and small quantities are employed to prevent their recurrence. In dysentery and diarrhœa its decoction was once much used; it is seldom given now, unless as Dover's powder, the opium of which aids in allaying pain and tenesmus.

Ipecacuan is a certain and safe emetic when ℈j or upwards is taken, operating within twenty minutes, and causing full vomiting; it is used where we wish merely to evacuate the stomach when it contains undigested food, and in the gastric affections of children; it has not the depressing effects of tartarized antimony, and has no influence over acute inflammations similar to that substance. Applied in liniment with three parts of olive oil, thrice daily, it causes an eruption of small vesicles, and may be used as a counter-irritant.

DOSE.—As an expectorating sedative, from half a grain to gr. j; to nauseate, gr. ij to iij; for an emetic, gr. xv to xx, to which tartarized antimony gr. j is often added.

Vinum Ipecacuanhæ, D. L. E. *Ipecacuan Wine.*

Preparation.—Ipecacuanha bruised ℥iiss, sherry wine Oij; macerate for fourteen days (seven days, E.), strain, express, and filter.

Used as an expectorant for adults, dose gtt x to xxxx; and as an emetic for children in doses of fʒss to fʒj, repeated every ten to fifteen minutes.

Syrupus Ipecacuanhæ, E. *Syrup of Ipecacuan.*

Preparation.—Ipecacuan in coarse powder ℥iv, rectified spirit f℥xv; digest for twenty-four hours with gentle heat, strain, squeeze the residue and filter; repeat the process with the residue and proof spirit f℥xiv, and again with water f℥xiv; unite the fluids, distil off the spirit until f℥xij remain; mix this with rectified spirit f℥v, and syrup Ovij.

It might be easier made from an alcoholic extract dissolved in syrup, as directed by Guibourt; or from an infusion of the root ℥j, boiling water f℥xij, spirit f℥ij, with sugar and water, enough to form syrup Oij. Each fʒj contains about gr. iss of ipecacuan.

Dose.—As an emetic for infants fʒss; for adults f℥j to f℥iss.

Pulvis Ipecacuanhæ Compositus, D. L. E. *Compound Powder of Ipecacuan.*

Preparation.—Powdered ipecacuan ʒj, powdered opium ʒj, sulphate of potash ℥j; mix, and pass through a fine sieve.

An imitation of Dr. Dover's celebrated powder, which contained nitre; it acts both as an anodyne and diaphoretic, and is prescribed in diarrhœa, dysentery, rheumatism, mild catarrhs, &c.; it should not be given when the head is affected, the tongue dry, or the stomach very irritable.

Dose—Gr. v to xv usually in pills.

Pilulæ Ipecacuanhæ Compositæ, L. *Compound Ipecacuan Pills.*

Preparation.—Compound powder of ipecacuan ʒiij, squill ʒj, ammoniac ʒj; mix and form a pill mass with the mucilage.

Dose.—Gr. v, thrice daily, as an expectorant in chronic cough.

Pilulæ Ipecacuanhæ et Opii, E. *Ipecacuan and Opium Pills.*

Preparation.—Powder of ipecacuan and opium three parts, conserve of roses one part; mix and divide into gr. iv pills. *Dose.*—One or two pills.

VALERIANACEÆ. *The Valerians.*—Herbs, leaves opposite, no stipules; flowers in corymbs or heads; calyx superior, membranous, becoming a pappus; corolla tubular, sometimes irregular; stamens one to five; ovary with one perfect and two abortive cells, ovules pendulous; fruit dry, without albumen.

VALERIANA OFFICINALIS, D. L. E. *Wild Valerian.*

Root perennial, tuberous; stem three feet high, furrowed; leaves pinnate, leaflets lanceolate, seven to eight pairs; flowers in a corymb; calyx limb involute while flowering, then forming a deciduous pappus; corolla funnel shaped, five cleft, gibbous at the base; stamens three; fruit indehiscent, one celled, one seeded.

The wild plant, especially if grown in dry pastures, is more active than the cultivated valerian; its root is used, it consists of a tuberculated rhizome with numerous root fibres; when dried it is of brownish colour, its odour is strong, and disagreeable to most persons, its taste is rather bitter and acrid, with a warmth like camphor; it contains about one per cent. of pale green or yellow volatile oil, on which its smell depends, and which may be purified by re-distilling with magnesia; the root also yields valerianic acid, resin, gum, and woody fibre.

USES.—Its effects resemble camphor; it is employed for hysteria, chorea, and similar affections; in large doses it sometimes causes head-ache, nausea, or giddiness, and it is remarkable that with cats it produces a state of great excitement and apparently extreme delight; valerian should only be used when fresh, as by keeping its activity becomes impaired.

DOSE.—℈j to ʒj of the powder, which is the best mode of giving it when made from good valerian; or gtt ij to v of the essential oil.

Infusum Valerianæ, D. *Infusion of Valerian.*

Preparation.—Valerian root bruised ʒij, boiling water f℥ix; digest for one hour, and strain off f℥viij. *Dose.*—f℥j to ij.

Tinctura Valerianæ, D. L. E. *Tincture of Valerian.*

Preparation.—Valerian root bruised ℥v, proof spirit Oij; macerate for fourteen days, express, and filter. (Digest for seven days, or prepare by percolation. E.)

Dose.—fʒj to iij, added to the infusion.

Tinctura Valerianæ Ammoniata, L. E. *Ammoniated Tincture of Valerian.*

Preparation.—L. Valerian bruised ℥v, aromatic spirit of ammonia Oij; macerate for fourteen days, and strain.

E. Valerian bruised ℥v, spirit of ammonia Oij; prepare like tincture of cinchona.

Dose.—fʒj to ij, properly diluted; it is a useful stimulant and antispasmodic.

COMPOSITÆ. *Composite Order.*—It forms about one tenth of the vegetable kingdom. They are rarely trees; the flowers are in heads, surrounded by an involucre, seated on a receptacle, whence paleæ often rise; calyx obsolete or a pappus; corolla monopetalous; stamens five, anthers united in a tube which is perforated by the style; ovary inferior, one celled with a single erect ovule, no albumen.

ANTHEMIS NOBILIS, D. L. E. *Chamomile.*

Root perennial, with long fibres; stems procumbent when wild, erect if cultivated, a foot long, branched, hollow, and leafy; leaves doubly pinnate; leaflets linear, slightly downy, flower heads terminal, solitary, with a convex yellow disk; florets hermaphrodite, tubular five toothed; receptacle conical with membranous paleæ; involucre imbricated, in a few rows.

Chamomile grows wild, and is cultivated in England and the the north of Ireland, flowering from June to September; the activity of the flowers depends on a bitter they contain, and on volatile oil which causes their peculiar odour; as the oil is found in the centre yellow disk of the single flowers, they are best for medical use, although fashion has given the preference to the less active double flowers. Chamomile is employed as a tonic in dyspepsia, and often combined with saline purgatives; it was once valued as a remedy for ague. Externally they are used for stupes, their only benefit is retaining heat for a long time; and if the hot flowers are squeezed very dry, and placed between thin folds of linen, they form a good poultice over tender inflamed parts.

DOSE.—Gr. x to xx of the powder, rarely exhibited.

Infusum Anthemidis, D. L. E. *Infusion of Chamomile.*

Preparation.—D. Dried chamomile ℥ss, boiling water f℥xij; infuse for fifteen minutes, and strain off f℥viij.

L. E. Chamomile ʒv, boiling water Oj; infuse for ten minutes (twenty minutes, E.) and strain.

Dose.—f℥ss to f℥ij, as a tonic; if taken warm, or when a decoction is used, it causes vomiting and is often employed to aid the action of emetics.

Extractum Anthemidis, E. *Extract of Chamomile.*

Preparation.—Chamomile ℔j, water cong. j; boil down to Oiv, filter while hot, and evaporate to a due consistence in a vapour bath.

As all the essential oil is dissipated in making it, this is a simple bitter, not superior to extract of gentian. *Dose.*—Gr. v to x.

Oleum Anthemidis, D. L. E. *Oil of Chamomile* is obtained by distilling the flowers with water; it is pale blue when fresh, becoming yellow if kept; it has a strong odour of the plant, and a pungent taste; this oil is used as a stimulant, with purgative pill masses or combined with the extract. *Dose.*—Gtt j to iij.

Inula Helenium, L. *Elecampane.*

A perennial, three feet high; leaves large, amplexicaul, downy beneath; flower heads terminal, yellow; involucre in many rows; ray florets female, ligulate; florets of disk tubular, five toothed, hermaphrodite.

It grows through Europe, flowering in June; the dried root is used, it contains in 100 parts, 37 of inulin, a substance like starch, but deposited from hot water on cooling, and coloured yellow by iodine; mixed with elecampane camphor, bitter extract, wood, &c. Elecampane is an aromatic bitter, and in large doses causes vomiting; it is seldom employed. *Dose.*—℈j to ʒj, in powder.

Anacyclus Pyrethrum, L. E. *Pellitory of Spain.*

Root fusiform ; stem procumbent and downy ; leaves petiolated, spreading, stem leaves sessile ; involucre in few rows ; receptacle convex, with paleæ ; ray florets female, sterile, white, purple inferiorly ; disk florets yellow, tubular.

Its root is brought from Africa, in dried pieces, the bulk of a finger; when chewed it causes a pungent sensation of the tongue and lips, and a flow of saliva. Its effects depend on an acrid resin termed pyrethrin; it is used in a strong tincture, or chewed, to relieve tooth-ache, in some rheumatic affections of the face, and for paralysis of the tongue.

Artemesia Absinthium, L. E. *Wormwood.*

A shrub, stems many and downy, leaves tripinnatisect in deep segments, the lower on long, the upper on short footstalks ; flower heads in leafy clustered panicles ; florets pale yellow, the outer row female ; styles deeply cloven ; receptacle convex, with silky hairs.

The dried herb and flowers are used; they have a disagreeable odour, depending on volatile oil, and a very bitter taste; when calcined they leave much impure carbonate of potash. Wormwood is an aromatic tonic seldom prescribed; large doses are stated to cause head-ache; it may be given in infusion.

TARAXACUM DENS LEONIS, D. L. E. *Dandelion.*

Root spindle shaped, juice milky ; leaves radical, runcinate ; scapes brittle, with a single head of yellow flowers, which expand in fine weather ; involucre double, outer scales spreading, internal ones erect ; receptacle naked ; achenium oblong, ending in a long beak ; pappus hairy, in many rows, radiating to form a light globe.

This well known plant abounds in bitter, milky juice, which is most perfect towards the end of summer, and Mr. Squire states, that to procure ℔j of extract in November and December, Oiv of juice suffice; while in spring, Oviij or ix are necessary; and Ovj to vij from June to August; frost causes the juice to taste sweetish. It is used as a tonic, and in large doses is slightly aperient; many consider it useful in chronic hepatic affections, as jaundice, enlargements, or subacute inflammations of the liver, and dyspepsia with disordered bilious secretions; it is more than doubtful whether its ordinary preparations have any efficacy, and the fresh juice is much preferable to them.

Decoctum Taraxaci, E. *Decoction of Dandelion.*

Preparation.—Fresh taraxacum herb and root ℥vij, water Oij, boil down to Oj, and strain.

Dose.—f℥j to ij, saline purgatives are sometimes added to it.

Extractum Taraxaci, L. E. *Extract of Dandelion.*

Preparation.—L. The fresh root bruised ℔ijss, boiling water cong. ij;

macerate for twenty-four hours, boil down to cong. j, strain while hot and evaporate to an extract.

E. The root ℔j, water cong. j; make as extract of poppies.

Dose.—Gr. x to xxx, added to the expressed juice or decoction; it is brownish and should be bitter, but in general is quite sweet and useless. Dissolved in water, with a little spirit, it is sold as fluid extract of taraxacum.

Liquor Taraxaci is made from fresh sliced roots ℥xij, infused for twenty-four hours in enough water to cover them, express and let the fecula subside; decant, heat to 180°, while hot filter, evaporate to f℥xiv, and add rectified spirit f℥iv. *Dose.*—fʒss to fʒij.

LACTUCA SATIVA, D. L. E. *The Garden Lettuce.*

Annual, stem smooth, two feet high, branched above; leaves large, erect, oval, half clasping the stem; its yellow flowers appear in August; they are smaller than the Lactuca Virosa.

Before the flower-stem of the lettuce arises, its juice is mild and colourless, afterwards it becomes both milky and bitter; it exudes from incisions made in the stem, and when dried, constitutes *Lactucarium*; this forms hard, brown masses, of bitter taste, and having a weak opiate odour; its analysis has not shewn the presence of any morphia; it yields a bitter crystalline substance, lactucin, with resin, wax, sugar, &c. Lactucarium is considered anodyne, its effects are slight and uncertain; like every succedaneum for opium it is said to cause no head-ache or stimulation, it also has but little sedative action; this drug has been mostly employed in phthysis. DOSE.—Gr. iij to ʒss.

Lactuca Virosa, D. E. *Strong-scented Lettuce.*

Biennial, abounding in acrid milky juice; stem four feet high, panicled above; leaves horizontal with a prickly keel; flower-heads many; florets yellow.

It grows about hedges and old walls, and is distinguished by its rank smell, and the red spots on its stem; it yields thrice as much lactucarium as the L: Sativa, and it is said of better quality; this substance is now principally got from it.

Tinctura Lactucarii, E. *Tincture of Lactucarium.*

Preparation.—Lactucarium in fine powder ℥ij, proof spirit Oj; it is best made by percolating, but may be got by digesting a coarse powder in spirit. *Dose.*—Gtt x to fʒi; one drachm is equal to gr. vj of lactucarium.

Trochisci Lactucarii, E. *Lactucarium Lozenges.*

Made like opium lozenges; each contains about the sixth of a grain of the drug.

LOBELIACEÆ. *Lobeliads.*—Milky plants, leaves alternate, no stipules: flowers irregular; calyx five-lobed, adhering more or less to the ovary; petals five: stamens five, anthers cohering: stigma fringed: fruit one or two-celled, many seeded; embryo strait, in albumen.

LOBELIA INFLATA, D. L. E. *Indian Tobacco.*

Annual, a foot high, stem angular, leaves serrate and hairy; flowers in racemes; corolla blue, bilabiate; the two inferior anthers barbed at the point; capsule two-celled, ten angled, inflated, crowned with the calyx.

A common weed in the United States; it is dried when the capsules have formed, at the end of August, and exported by the Shaking Quakers of New York, in compressed masses, weighing ℔ss to ℔j each; the whole plant is used, it is greenish yellow, with a nauseous smell, and tastes like tobacco. Eberle considers its capsules and root most active; it contains lobelina, a substance like nicotine, with resin, colouring, gum, &c. Its effects are similar to tobacco; ℈j acts as a nauseating emetic, causing depresssion, sweating, and often purging; it has been used in England and America by ignorant persons, in doses of a teaspoonful; if not soon ejected by vomiting, this will produce extreme exhaustion, pain, anxiety, and death, with convulsions or insensibility. For asthma, lobelia is given in small repeated quantities, or in a larger dose at the beginning of an attack, and from the nausea it causes sometimes checks the paroxysms; it is also prescribed for hooping cough and chronic bronchitis; like tobacco its effects are variable and often violent. DOSE.—Gr. ij to v.

Tinctura Lobeliæ, D. E. *Tincture of Lobelia.*

Preparation.—Lobelia in coarse powder ℥v, proof spirit Oij, macerate for fourteen days, and strain. (Make by percolation or digestion, E.)

Dose. —fʒj to ij, every two or three hours until it acts as an emetic; or gtt v to fʒss, as an expectorant.

Tinctura Lobeliæ Etherea, E. *Etherial Tincture of Lobelia.*

Preparation.—Lobelia in fine powder ℥v, spirit of sulphuric ether Oij, digest for seven days; it is better made by percolation.

Dose.—Like the spirituous tincture.

ERICACEÆ. *Heaths.*—Shrubs or small trees; leaves evergreen, no stipules; calyx free, four or five cleft; corolla hypogynous, four or five parted; stamens definite, anthers two-celled, often with a bristle-like appendage, opening at the base or apex; ovary inferior, becoming a berry or drupe, or half superior, becoming capsular; many-celled and seeded.

ARCTOSTAPHYLOS UVA URSI, D. L. E. *Bear-berry.*

A trailing shrub; leaves coriaceous, obovate; flowers in terminal clusters, each with three small bracts; corolla rose coloured; stamens ten, inclosed; anthers compressed, opening at the apex and laterally, having two reflexed awns; ovary globose, surrounded by three scales; berry scarlet, with five single-seeded cells.

Uva ursi grows in this country, and over the northern alpine heaths; the leaves are collected in autumn, they are dark green and shining above, lighter coloured and reticulated on the under surface, have a bitter, astringent taste, but no odour; and contain gum, extractive, resin, some gallic acid, and 36 per cent. of tannin; they are sometimes adulterated with whortle-berry leaves, which are distinguished by having minutely toothed edges, and their under surface dotted; box leaves are also occasionally mixed with them, they have no astringence.

USES.—An astringent employed in chronic mucous affections of the bladder, to diminish irritation and discharge; Prout gave it combined with hyociamus; its action is slow and requires to be persevered in for a long time; large doses are liable to cause nausea.

DOSE.—℈i to ʒj of the powder; rarely used.

Decoctum Uvæ Ursi, D. L. *Decoction of Bear-berry.*

Preparation.—D. Uva ursi leaves bruised ℥ss, water Oss, boil for ten minutes, and strain off f℥viij.

L. The bruised leaves ℥j, water Oiss, boil down to Oj, and strain.

Dose.—f℥j to iij, twice or thrice daily.

Extractum Uvæ Ursi, L. *Extract of Bear-berry.*

Preparation.—Uva ursi leaves bruised ℔iiss, boiling water cong ij, macerate for twenty-four hours, boil down to cong j, strain while hot and evaporate to an extract.

Gr. v to xv, thrice daily; often added to the decoction.

CHIMAPHILA UMBELLATA, D. L. E. *Winter Green.*

A small shrub, leaves coriaceous on short petioles, smooth and shining; flowers drooping, in corymbs, with linear bracts; petals white, tinged with pink, spreading; stamens ten; ovary roundish, obtusely angular; cells of the capsule dehisce at the apex.

It grows in the northern woods, particularly in America, where it is termed pipsisewa by the natives, and flowers in June and July; the entire herb is used by D. and E. the leaves are employed by L. when fresh they have a peculiar odour if bruised, a bitter astringent taste, and cause vesication when applied to the skin; they yield bitter extract 18, resin 2·4, tannin 1·48, wood, gum, and salts 78·2, in 100 parts.

USES.—The decoction produces warmth in the stomach, and acts as a tonic, it also increases the secretion of kidneys, and it is said to diminish the quantity of lithic acid; it is given in chronic diseases of the bladder, as a diuretic for dropsies in debilitated persons, and in America it has been prescribed for scrofula.

Decoctum Pyrolæ, D. *Decoctum Chimaphilæ,* L.
Decoction of Winter Green.

Preparation.—D. Dried leaves of winter green ℥ss, water Oss; boil for ten minutes, and strain off f℥viij.

L. The dried leaves ℥j, distilled water Oiss; boil down to Oj, and strain.

Dose.—f℥j to ij, thrice daily.

STYRACEÆ. *The Storax Tribe.*—Trees and shrubs, often with stellate hairs; leaves alternate; flowers regular, calyx free or united to the ovary, four or five cleft; corolla three, five, or seven cleft; stamens united at the base, inserted into the bottom of corolla; ovary two, three, or five celled; ovaries four or more in each cell, the upper ones ascending, the lower pendant; drupe sometimes winged.

STYRAX OFFICINALE, L. E. *Storax Tree.*

A small tree, bark smooth, leaves villous beneath; flowers like the orange, in racemes; calyx downy, cup shaped; corolla, externally hoary; fruit the size of a cherry, downy, with one or two seeds.

This tree grows in Asia Minor; storax is obtained by incisions into its trunk, it is then collected and imported through Trieste; several varieties are known; common storax forms brown fragrant cakes, which are easily broken, it becomes soft when warmed, and contains saw dust; in the air it is soon covered by effloresced benzoic acid; the pure resin is also met, as well as a brown liquid storax; they consist of volatile oil, benzoic acid, resin, and gum; in addition to these, a factitious storax is sometimes made of saw dust, benzoin, and a little genuine storax. It is used in storax pill, to conceal the flavour of opium, for this it is purified.

Styrax Colatus, L. *Extractum Styracis,* E. *Purified Storax.*

Preparation.—L. Dissolve storax in rectified spirit, strain, and evaporate it to a proper consistence.

E. Boil storax in successive quantities of spirit, distil this off, and evaporate over a vapour bath to a thin extract.

Pilulæ Styracis Compositæ, L. *Pilulæ Styracis,* E. *Storax Pill.*

Preparation.—L. Strained storax ʒiij, opium powdered ʒj, saffron ʒj; mix.

E. Extract of storax two parts, opium, saffron, of each one part; mix, and divide into gr. iv pills.

Gr. v of L. or gr. iv of E. contain gr. j of opium. *Dose.*—Gr. v to x.

STYRAX BENZOIN, D. L. E. *Benzoin Tree.*

A large tree, branches downy, leaves pointed, oblong, downy beneath; flowers in axillary racemes; calyx campanulate, slightly five toothed, corolla usually of five petals, stamens ten; ovary superior.

It grows in Java and Sumatra, its resin, termed gum benzoin, is obtained by incising the tree when seven years old, the exudation is collected as it hardens, and each plant yields about ℔iij for ten or twelve years; at first it is white, afterwards the exudation becomes brown, and of inferior value; a still worse description is got by cutting the tree down and scraping the resin from the wood. Benzoin is seldom imported in tears, it is usually agglutinated in white irregular lumps by a darker resinous substance forming large blocks, and often mixed with chips of wood; its odour is fragrant, especially when heated, and its taste sweetish, becoming acrid if chewed for a time; in 100 parts it contains resin 78 to 80, benzoic acid 14, with some lignin and volatile oil.

USES.—To form benzoic acid; it is sometimes given in chronic catarrhs as a stimulant, its effects resemble myrrh, but are less tonic.

Tinctura Benzoini Composita, L. E. *Compound Tincture of Benzoin.*

Preparation.—L. Benzoin ℥iijss, strained storax ℥iiss, balsam of tolu ʒx, aloes ʒv, rectified spirit Oij; macerate for fourteen days and strain.

E. Benzoin in coarse powder ℥iv, balsam of Peru ℥iiss, East Indian aloes ℥ss, rectified spirit Oij; macerate for seven days, pour off the clear liquid, and filter it.

Known as Friar's balsam, and formerly applied to recent wounds to check bleeding, and for dressing foul ulcers; internally, it is given in doses of gtt xv to fʒij, as a stimulating expectorant; its resins are precipitated by water, but it may be suspended in emulsion.

ACIDUM BENZOICUM, D. L. E. $(C_{14}H_5O_3+1Aq.)$

Benzoic Acid.

Benzoic acid forms soft pearly flexible scales, of sour taste, odourless when pure, it fuses below 212°, and sublimes a little above this temperature, forming an acrid inflammable vapour; it dissolves in 25 parts of boiling or 200 of cold water, and is very soluble in alcohol. It is found in all vegetable productions termed balsams, except copaiba, and is considered as the oxide of a radical, benzule $C_{14}H_5O_2$, of which the oil of bitter almonds is a hydruret; this acid is usually got from gum benzoin, but can be procured from the urine of herbivora which contains hippuric acid, by keeping it for a time, or evaporating at a boiling temperature. It is not liable to adulterations, except the empyreumatic oil generated in making it, which is removed by wrapping the acid in blotting paper, and re-subliming.

Preparation.—D. Place benzoin in a small cylindric sheet iron pot, having a flange at its mouth; and having fitted the pot into a circular hole in a sheet of pasteboard, interpose between the pasteboard and flange a collar of tow, so as to form a nearly air tight junction. Let a cylinder of stiff paper, open at one end, eighteen inches high, and having a diameter at least twice that of the pot, be now placed in an inverted position on the pasteboard, and secured to it by slips of paper and flour paste; a couple of inches of the lower part of the pot being passed through a hole in a plate of sheet tin, which is to be kept from touching the pasteboard by interposing a few corks, apply a heat just sufficient to melt the benzoin (as a gas lamp), and continue it for at least six hours.

Wrap the product if not quite white, in bibulous paper, press it powerfully, and again sublime.

L. and E. give essentially similar directions.

USES.—Added to the camphorated and ammoniated tinctures of opium, from its supposed stimulating effects in chronic bronchitis. Dr. Ure proposed it as a remedy for lithic deposits; Dr. Garrod states, that it only causes urea to disappear, and is itself secreted as hippuric acid. Benzoin is considered to contain little or no benzoic acid naturally; it is formed during the sublimation.

DOSE.—Gr. ij to x.

OLEACEÆ. *Olive Tribe.*—Trees or shrubs, branches and leaves opposite; flowers in racemes; calyx monophyllous, permanent; petals valvate, four cleft; stamens two, inserted into the corolla; ovary two celled, seeds pendulous; stigma bifid or undivided; fruit a drupe or berry, often one seeded.

OLEA EUROPÆA, D. L. E. *The Olive Tree.*

A small evergreen, wood hard; leaves lanceolate, acute, hoary beneath; flowers white and small; calyx four toothed, ovary two seeded; drupe the size of a damson, purple, with one nut. A variety with long leaves, growing in France and Italy, yields the oil used in England; and one with broad leaves, cultivated in Spain, has a larger fruit, and affords a coarse oil.

Olive oil is got by expressing the fruit when near ripe, in a mill; fresh olives produce virgin oil, but if kept they soon decompose, and the oil is of inferior quality; the cake which remains is usually broke up again, mixed with boiling water and more strongly pressed to get a common oil for lamps and making soap. Its colour varies from pale to dark greenish yellow, it is a fixed or fatty oil, has a mild taste, and no smell when fresh; dens. ·910, by exposure to air it becomes rancid, but does not harden like drying oils; at 38°, it congeals, and at 20°, is readily separated into 72 parts of oleine or limpid oil, and 28 of margarine, a solid pearly fat.

ADULTERATIONS.—Cheaper vegetable oils, these are difficult of detection; they have been tested by shaking the oil in a bottle, if pure, it soon becomes free from bubbles, but when poppy oil is present they remain for a time. "With a twelfth of its volume of solution of nitrate of mercury, prepared for citrine ointment, it becomes in three or four hours a firm fat without any liquid oil separating, E." Christison states that five per cent. of foreign oil renders its consolidation slow and less firm, and twelve per cent. is detected by floating on its surface.

USES.—Employed as a base for ointments and liniments, and added to laxative enemas, the effects of which it cannot much increase; like all fat oils being rich in carbon, it aids respiration and fatty growth when used as an article of diet.—DOSE.—f℥ss to f℥j occasionally given as a mild aperient; f℥j to ij added to injections.

SOAP, D. L. E.

Made by boiling oily matters with alkaline fluids; the oils are decomposed, their olein, stearine, and margarine, separating into glycerine a sweet basic portion, and oleic, stearic and margaric acids, which unite with the alkalies to form soap. *Soft soap* is produced from fish oils, and a little tallow boiled with potash; it is yellowish, mottled with white spots, and smells disagreeably. L. and E. order it to be made out of olive oil, but such a soap is difficult to obtain. *Hard soap* is produced by saponifying fats with caustic soda; when olive oil is used the result is Spanish or Castile soap; if pure this is white; usually in the process sulphate of iron is added, which is decomposed by the alkali into black oxide of iron, causing mottled streaks in the soap, these change into red oxide by exposure to the air. The best common soap is made from tallow, and inferior kinds from grease; palm and cocoa nut oils are also extensively used by manufacturers; yellow soaps are obtained by adding resin to the materials for white soap in the process for making it.

USES.—Soap is employed as a vehicle for other remedies, to form pill masses, and render resinous purgatives more soluble and active; it is sometimes added to purgative enemas, and in various scalp eruptions, washing the head with soft soap is found serviceable; for liniments it is much used from its lubricating qualities.

Linimentum Saponis, D. L. E. *Soap Liniment.*

Preparation.—D. Castile soap in powder ℥ij, proof spirit f℥xvj, dissolve by gentle heat, add camphor ℥j, when melted, filter or decant off the clear liquid.

E. Castile soap ℥v, rectified spirit Oij, digest for three days, add camphor ℥iiss, oil of rosemary fʒvj, and agitate briskly.

L. Camphor ℥j, spirit of rosemary f℥xvj, melt and add soap ℥iij, and gently heat until dissolved.

Used as a mild stimulating liniment, it should not be applied to recent sprains or injuries; soft soap is often substituted for the Castile soap, but its smell is objectionable.

Ceratum Saponis, L. *Soap Cerate.*

Preparation.—Oxide of lead ℥xv, vinegar cong. j, boil over a slow fire until incorporated, add soap ℥x, and boil until all moisture is evaporated, then add wax ℥xiiss, melted in olive oil Oj.

Diacetate of lead is formed at first, and decomposed by the soap, the fatty acids of which unite with the oxide of lead, and the soda becomes an acetate; the wax and oil are added to give it a proper consistence. It is used as a mild dressing to ulcers.

Emplastrum Saponis, D. L. E. *Soap Plaster.*

Preparation.—D. Litharge plaster ℔iiss, melt and add Castile soap in powder ℥iv, and heat together until incorporated.

L. *Uses.*—Litharge plaster ℔iij, soap sliced ℔ss.

E. Litharge plaster ʒiv, gum plaster ℥ij, Castile soap in shavings ℥j.

Applied on linen or leather as a mechanical support to wounds and large ulcers, and to defend the tender surfaces from pressure; it should be spread freshly as required.

ORNUS EUROPÆA. *The Flowering Ash.*

A tree twenty-five feet high, leaves impari-pinnate, with seven to nine stalked, serrate leaflets; panicles dense, terminal; calyx small; corolla white, divided in linear segments; fruit a capsule, with a flat obtuse wing

It grows in the south of Europe, in Calabria, and Sicily, and yields manna, which is said to be also produced by other species; the bark is incised in August and September, a clear juice flows out and concretes on the stem, on leaves placed to receive it, and in vessels. The best flake manna is white or yellowish, in stalactitic pieces hollowed on one side, having a faint odour, and mawkish, slightly acrid taste; it is imported in deal boxes, often lined with tin. Sicilian, common, or fat manna is in viscid, irregular shaped, small pieces, of dirty brown or yellow colour, often mixed with impurities; its taste is more acrid and nauseous than flake manna.

Pure manna dissolves in three parts of cold, or one of boiling water; it contains about 60 per cent. of mannite mixed with uncrystallizable sugar, gum, and the colouring which is supposed to be purgative; mannite is extracted by boiling alcohol and deposited on cooling in acicular crystals; it is a sugar, but is distinguished by not fermenting.

USES.—When fresh it appears only nutritious, by keeping it becomes a mild laxative, probably of the same value as treacle; the common kind is most active, though flake manna is preferred.

DOSE.—ʒj to ij given to infants dissolved in some aromatic water, or added to aperient draughts.

ASCLEPIADACEÆ. *Asclepiads.*—Shrubs or herbs, milky and often twining; leaves entire opposite, with ciliæ between them; calyx permanent; corolla regular; anthers two celled, pollen in masses, attached to the stigma by five glands; ovaries two, with terminal styles; follicles two.

HEMIDESMUS INDICUS. *Indian Sarsaparilla.*

Roots cylindrical, tortuous, its cortex deeply furrowed in rings, around a woody meditullum; stems twining, woody and slender, leaves on short footstalks, bright green; flowers, small, greenish purple in axillary cymes.

This is often termed smilax aspera; it is a native of the East Indies; the root is imported in pieces six to twelve inches long, and about as thick as a quill, its surface is reddish brown, furrowed longitudinally, and marked by transverse rings, its odour is aromatic like the tonquin bean, and it tastes sweetish; Mr. Garden obtained a volatile crystalline acid from it, the hemidesmic acid. It is used in the East as a substitute for sarsaparilla, and was introduced for the same purpose into this country; but is chiefly employed in the—

Syrupus Hemidesmi, D. *Syrup of Indian Sarsaparilla.*

Preparation.—Indian sarsaparilla bruised ℥iv, boiling water Oj, infuse for four hours and strain; let the sediment subside, and dissolve in the clear liquor twice its weight of sugar by a water or steam heat.

Used for flavouring cough mixture. *Dose.*—fʒj to iij.

LOGANIACEÆ. *The Loganiads.*—Shrubs or trees, leaves opposite, entire, often stipulate, flowers in racemes; calyx toothed, permanent; corolla sometimes irregular, usually five lobed; stamens five, anthers opening lengthwise; ovary two celled or spuriously four celled; fruit capsular, with the valves turned in, bearing the placenta, or berried, with the seeds in a pulp, albumen fleshy.

SUB-ORDER. *Spigelieæ.*—With stipules; corolla valvate; carpels two, many seeded, embryo and cotyledons small.

SPIGELIA MARILANDICA, L. E. *Carolina Pink.*

Root perennial, stems erect; racemes terminal, one sided, with three to eight flowers; corolla scarlet, long, and funnel shaped; capsule smooth, of two carpels; seeds many.

This herb, also known as perennial worm grass, grows in the southern States of America; its effects were discovered by the Cherokee Indians, who collect and dry the entire plant. Its root consists of a short knotty rhizome with many slender brown fibres, having a faint smell, and bitterish taste, the leaves and stem are usually attached to it, they are less active than the root, and not employed; the active principle of the plant is supposed to be a bitter extractive matter.

USES.—In America the fresh root is prescribed for worms, especially the lumbricus, but the dried plant is rarely used; in poisonous doses it causes vertigo and convulsions, these are said not to occur when it purges or is combined with aperients; it may be given in infusion, by macerating ℥ss of the root in water Oj, for an hour, dose f℥iv for an adult; or in powder, dose ʒj to iij; for a child of three or four years old, gr. x to xx may be directed night and morning for several days.

SUB-ORDER. *Strychneæ.*—Flowers regular; corolla valvate; embryo rather large; berry two celled, many seeded, or from abortion one celled, one seeded; seeds peltate, apterous.

STRYCHNOS NUX VOMICA, D. L. E.

Nux Vomica Tree.

A moderate sized tree, bark smooth and grey, wood white, hard and bitter; leaves on short petioles, oval and smooth, three to five nerved; flowers small, greenish white, in terminal corymbs; corolla funnel shaped; ovary two celled; berry smooth, the size and colour of an orange, with a fragile shell, filled by gelatinous pulp, containing the seeds attached to a central placenta.

It is a native of the Indian forests; its seeds seem to have been long known in the East, they are round and flat, or shield shaped, hardly an inch in diameter, covered with a thick, tough coating, containing the horny bitter nucleus, having in its centre a cavity, and at one side of this the embryo with its thin cotyledons; they have no odour, and are very difficult to powder. Pelletier found in them, strychnine and brucine, united with strychnic or igasuric acid, a yellow colouring matter, oil, gum, and starch. Its bark was imported many years since in mistake for angostura, and caused some serious accidents, (see angostura.)

Brucine $C_{44}H_{25}N_2O_7$ forms crystalline scales, soluble in alcohol, or in 500 parts of water; it is less bitter than strychnine, which it resembles, and Dr. Fuss considers it is only impure strychnine mixed with colouring matter; nitric acid renders it a bright red colour.

USES.—In small doses it acts as a tonic, and promotes digestion; a larger quantity produces spasmodic twitchings of the voluntary muscles, apparently by affecting the medulla spinalis, for the mind is undisturbed in those under its influence; and if repeated doses are exhibited, the convulsive attacks become severe, being brought on by the slightest causes, as attempting to walk, or when the patient is suddenly spoken to; while an excessive dose will produce rapid death with all the symptoms of severe tetanus. From these effects it has been employed in the treatment of paralysis; when this depends on organic disease, softening of the brain or cord, or hemorrhagic effusions, stimulating the affected part must often be injurious, as it is likely to excite fresh inflammation or disease; hence the cases in which nux vomica may be prescribed are not numerous; in local paralytic attacks, amaurosis, palsy from lead, or paralysis of the bladder it is often given with success; and for chorea, amenorrhœa, dyspepsia, and some forms of epidemic dysentery it has been used with occasional benefit. Nux vomica is now seldom prescribed, as strychnine its active principle, is preferred by practitioners, from its uniform composition, and the ease with which its dose may be apportioned; it is worth observing that its effects when used for paralysis, are especially evident in the paralysed muscles.

DOSE.—Of nux vomica gr. ij in powder, gradually increased to gr. xv; rarely employed.

Extractum Nucis Vomicæ, E. *Extract of Nux Vomica.*

Preparation.—Expose nux vomica to steam until it is completely softened; slice and dry it, and immediately grind it in a coffee mill; exhaust the powder by percolation or boiling with rectified spirit until the spirit comes off free from bitterness; distil off the greater part of this spirit and evaporate the rest in a vapour bath to a proper consistence.

Dose.—Gr. ss gradually increased to gr. ij in pill, it is seldom employed.

Strychnia, D. L. E. *Strychnine.*

Preparation.—D. Nux vomica in powder ℔j, macerate for twenty-four hours with water, cong. ss, and sulphuric acid fʒij, then boil for half an hour and decant; boil the residue twice, each time with water cong. ss, and sulphuric acid fʒj, and strongly express the undissolved part. Filter the decanted and expressed liquors and evaporate them to the consistence of syrup; boil this with rectified spirit Oij, for twenty minutes, adding slacked lime ℥j, in successive portions during the ebullition, until the solution becomes decidedly alkaline. Filter through paper, and having distilled off the spirit, dissolve the residue in dilute sulphuric acid, and to the resulting liquid, after filtering, add a slight excess of solution of ammonia; collect the precipitate on a filter, dry it, and dissolve it in a minimum of boiling rectified spirit, digest with animal charcoal ℥ss for twenty minutes, filter, and let it cool, when the strychnia will separate in crystals.

L. Nux vomica bruised ℔ij, rectified spirit cong. j, boil for an hour in a retort, with a receiver; pour off the liquid and boil the residue twice with spirit cong. j, and the spirit that distils over; press the residue and distil the spirit from the mixed and strained liquor, evaporate it to an extract, dissolve in cold water and strain. Evaporate gently to a syrup, saturate with magnesia, shake together, and after two days pour off the clear liquor; press the residue in cloth, boil it in spirit, strain, and let the spirit distil; to what remains add a very little sulphuric acid mixed with water, and macerate with gentle heat, set it aside for twenty-four hours, until crystals form, press and dissolve them, add ammonia, and shake that the strychnia may be thrown down; lastly melt in boiling spirit and set it aside to obtain pure crystals.

E. Nux vomica ℔j, steam it for two hours, slice, dry, and grind it in a coffee mill; macerate for twelve hours in water Oij, and boil it; strain and squeeze the residue, macerate and boil again twice, with water Oiss; concentrate the decoctions to a thin syrup, add quick lime ℥iss in the form of milk of lime; dry the precipitate in a vapour bath, powder, and boil it in successive portions of spirit until the spirit ceases to taste bitter; distil off the spirit till the residue crystallizes on cooling; purify the crystals by repeated crystallizing.

By D. and E. water is used to extract strychnine united with strychnic acid, from the nut; D. uses some sulphuric acid in the water; lime is then employed by D. and E. and magnesia by L., to combine with the acid; and set strychnine free, which is dissolved by hot rectified spirit and crytallizes as it cools; it is afterwards purified,

Strychnine is white, intensely bitter, and without smell; it forms prisms, or octohedral crystals; when heated it fuses, but does not volatilize, it dissolves in 2500 parts of boiling, or 6667 of cold water, nearly f℥xiv of water being requisite to melt gr. j of this substance; strychnine reacts as alkali, and is composed of $C_{42}H_{25}O_4N_2$; nitric acid has no effect on it when pure, but it is always sold contaminated with brucine, or resinous matter, which renders it bright red when the acid is added; it is also sometimes met as a greyish powder, which being liable to adulterations, should not be employed medically, if crystallized strychnine can be obtained.

USES.—Similar to nux vomica, as a substitute for which it is generally prescribed.

DOSE.—The sixteenth of a grain, gradually increased until some effect is produced, in pill thrice daily; its use requires great care, as it is highly poisonous, and we have no antidotes for it.

Strychniæ Murias, D. *Muriate of Strychnine.*

Preparation—Strychnia ℥j, dilute muriatic acid f℥j, or a sufficiency, water f℥iiss, heat until a perfect solution is got; cool, and dry the crystals that form on blotting paper; by evaporating the residue to one-third, more crystals will be obtained.

It crystallizes in rather soluble needles. *Dose*, and effects similar to strychnine.

GENTIANEÆ. *The Gentians.*—Herbs; leaves opposite, entire, often ribbed, no stipules; calyx permanent and inferior; corolla hypogynous, with twisted or plaited æstivation; stamens inserted on corolla; ovary one celled, styles two, at times united; capsule many seeded, the margins of the valves inverted; embryo in the axis of fleshy albumen.

GENTIANA LUTEA, D. L. E. *The Gentian.*

Stem erect, three feet high, hollow; leaves ovate, five to seven ribbed, the upper amplexicaul; flowers yellow, in an interrupted spike of whorls; calyx spathe-like; corolla rotate, four to six cleft; stigmas two; capsule one celled, seeds roundish.

Its root is collected on the Alps and Pyrennees, and imported when dried; it is in pieces of varying size, often branched, and half an inch to two inches thick; its epiderm is brown, with annular wrinkles, and furrowed along its length; internally it is yellow and spongy; its odour is feeble, and it tastes very bitter; it contains gentianite a bitter substance not yet isolated, with volatile oil, gum, sugar, and gentisic acid. Gentian root is not liable to adulterations in this country.

USES.—Similar to the other tonic bitters, and prescribed as a vehicle for antacids and saline cathartcis; it was formerly used in ague, and gout.

Infusum Gentianæ Compositum, D. L. *Infusum Gentianæ*, E. *Infusion of Gentian.*

Preparation.—D. Bruised gentian ʒij, dried orange peel ʒij, boiling water Oss; infuse for one hour, and strain off f℥viij.

L. Gentian sliced ʒij, orange peel ʒij, fresh lemon peel ʒiv, boiling water Oj; macerate for one hour and strain.

E. Gentian sliced ℥ss, orange peel, coriander, of each bruised ʒj, proof spirit f℥iv; infuse for three hours, add cold water f℥xvj, and in twelve hours more, strain through calico.

Dose.—f℥ss to f℥ij. The E. form is objectionable from the spirit, and the time used in preparing it.

Mistura Gentianæ Composita, L. *Compound Gentian Mixture.*

Preparation.—Compound infusion of gentian f℥xij, compound infusion of senna f℥vj, compound tincture of cardamoms f℥ij; mix. *Dose.*—f℥j to ij.

Tinctura Gentianæ Composita, D. L. E. *Compound Tincture of Gentian.*

Preparation.—D. Bruised gentian ℥iij, bitter orange peel ℥iss, cardamoms bruised ℥ss, proof spirit Oij; macerate for fourteen days, strain, press, and filter.

L. Gentian ℥ijss, dried orange peel ʒx, cardamoms bruised ʒv, proof spirit Oij; make as D.

E. Gentian ℥ijss, orange peel ʒx, canella in moderately fine powder ʒvj, cochineal bruised ʒss, proof spirit Oij; made by macerating, or better by percolation.

Dose.—fʒss to fʒij, added to the infusion, or to other tonics.

Extractum Gentianæ, D. L. E. *Extract of Gentian.*

Preparation.—D. Gentian in thin slices ℔j, water Oiss; macerate for six hours, strain and express, macerate the residue with water Oiss for six hours, mix the liquids and evaporate to an extract.

L. Gentian sliced ℔ijss, boiling water cong. ij; macerate for twenty-four hours, boil down to cong. j, strain while hot and evaporate to an extract.

E. Mix gentian in moderately fine powder, with half its weight of water, in twelve hours exhaust it by percolation; concentrate the liquor, filter it before it is too thick, and evaporate to an extract.

Gentian yields half its weight of extract; it is used as a vehicle for other remedies, particularly salts of iron. *Dose.*—Gr. v to xx.

Vinum Gentianæ Compositum, E. *Compound Wine of Gentian.*

Preparation.—Gentian ʒiv, yellow cinchona ℥j, bitter orange peel ʒij, canella ʒj, all in coarse powder; digest in proof spirit f℥ivss for twenty-four hours; add sherry f℥36, digest for seven days, strain, press, and filter.

Dose.—fʒij to ℥j.

AGATHOTES CHIRAYITÆ, D. E. *Chiretta Plant.*

An annual, three feet high, with strait round stem; leaves amplexicaul, lanceolate, five to seven nerved; flowers in cymes; calyx four cleft; corolla yellow, rotato; stamens four; capsules one celled, two valved; seeds numerous.

It grows in Nepal, and is used over India as gentian is in Europe; the entire plant is dried when its flowers are fading, and imported in bundles; its root is fibrous, its stem about the thickness of a straw; it is odourless, though intensely bitter; no satisfactory analysis has yet been made of this plant. Its effects are tonic, like other bitters, and it may be employed similarly to them.

Infusum Chirettæ, D. E. *Infusion of Chiretta.*

Preparation.—D. Chiretta bruised ʒij, boiling water f℥ixss; infuse for one hour, and strain off f℥viij.

E. Chiretta ʒiv, boiling water Oj; infuse for two hours, and strain.

Dose.—f℥j to ij.

Tinctura Chirettæ, D. *Tincture of Chiretta.*

Preparation.—Chiretta bruised ℥v, proof spirit Oij; macerate for fourteen days, and filter. *Dose.*—fʒj to ij, added to the infusion.

Erythræa Centaurium, L. E. *Centaury:*

A foot high, radical leaves obovate, stem leaves oval or acute; flowers pink, in a panicle, calyx five parted; corolla salvar-shaped, tube twice as long as the calyx; capsule imperfectly two celled.

The plant grows on dry pastures over Europe, and should be gathered while flowering in July; being very bitter, it might be used instead of gentian, at present it is rarely employed.

Menyanthes Trifoliata, L. E. *Bogbean.*

Rhizome creeping, jointed; stem leafy, leaves ternate, on long stalks, leaflets oval; racemes with many white or flesh coloured flowers; corolla funnel shaped, five parted, fringed with white hairs; capsule one celled.

This handsome plant grows in ditches and bogs, over Europe; it is bitter and odourless, and is sometimes used in this country instead of gentian; in large doses it is cathartic and emetic. It may be given in infusion.

CONVOLVULACEÆ. *Bind Weeds.*—Twining herbs or shrubs, juice often milky; leaves alternate; calyx permanent, of five imbricated sepals; corolla monopetalous, hypogynous, plaited; stamens five, inserted in corolla; ovary with two to four cells, and one or two erect seeds in each; capsule, its valves fitting to the angles of a loose dissepiment; embryo curved.

CONVOLVULUS SCAMMONIA, D. L. E. *Scammony.*

Roots perennial, tapering, four feet long, having an acrid milky juice; stems annual, and leaves on long petioles, arrow shaped; peduncles solitary, axillary, three flowered; corolla pale yellow with purple stripes; ovary two celled, four seeded; capsules two seeded.

Scammony is got by slicing the top of the root obliquely, and collecting its juice in shells and other vessels, after twelve hours they are removed, their contents mixed and allowed to harden; each plant yields only a few drachms of the resin. It is chiefly brought from Smyrna, and varies much in price and quality; the best or virgin scammony is in irregular masses, easily broken, resinous looking, greenish black, and having many air holes through it; its odour is peculiar, somewhat like old cheese, its taste is slight and then acrid, dens. 1·21. Inferior scammony is adulterated with chalk, it effervesces on adding an acid, its colour is grey, it is hard to break, and its dens. is 1·46; a worse description still, contains starch as well as chalk, which can be detected by the effects of iodine on its decoction when cold. It may also be adulterated with sand or guaiacum resin, the latter is tested by forming a tincture of it and dropping it upon a sliced potato which becomes blue with guaiacum; scammony is probably one of the most adulterated articles in the materia medica, its price being so high that it is rarely sold pure, and a few years ago it could not be obtained of good quality at all.

USES.—A powerful purgative, operating by directly irritating the mucous membrane, and liable to gripe where there is deficiency of mucus in the bowels; it is added to other cathartics for children as a vermifuge, and employed for adults in combination with the purgative pill masses.

DOSE.—If pure, gr. iij to viij; double this quantity may be given of ordinary scammony; it should be finely powdered.

Pulvis Scammonii Compositus, D. L. E. *Compound Scammony Powder.*

Preparation.—D. Scammony in powder ℥j, compound powder of jalap ℥iij, mix and sieve.

L. Scammony ℥ij, hard extract of jalap ℥ij, ginger ℥ss, powder and mix.

E. Scammony, bitartrate of potash, of each equal parts, mix.

Dose.—Of D. and E. gr. ij to viij; of L. gr. j to v; as a purgative for children, to relieve head affections, for worms, &c.

Confectio Scammonii, D. L. *Confection of Scammony.*

Preparation.—D. Scammony in fine powder ℥iij, ginger powder ℥iss, clarified honey ℥iss by weight, syrup f℥iij, mix, add oil of cloves fʒss, oil of caraway fʒj, and mix well.

L. Scammony ℥ss, cloves ʒvj, ginger ʒvj, finely powder and mix them; when used add syrup of roses enough to form the confection, and lastly oil of caraway fʒss, mix.

An aromatic purgative, sometimes added to infusion of senna; ʒj of D. is equal to ℈j of scammony. *Dose.*—Gr. x to ℈ij for an adult.

Extractum sive Resina Scammonii, E. *Extract of Scammony.*

Preparation.—Boil scammony in fine powder with successive quantities of proof spirit till it ceases to dissolve anything, filter, distil the liquid until little but water passes over, then pour the watery solution from the resin, wash it with successive portions of boiling water, and dry at a heat not above 240°.

This is pure scammony; its composition is $C_{40}H_{35}O_{20}$, having more oxygen than any other resin yet analyzed; it is brown, and in thin layers transparent; by charcoal it may be decolourized. *Dose.*—Gr. ij to viij.

Mistura Scammonii, E *Scammony Mixture.*

Preparation.—Resin of scammony gr. vij, gradually rub with unskimmed milk f℥iij.

Milk suspends scammony, and disguises its taste. *Dose.*—f℥ij.

EXOGONIUM PURGA, D. *Jalap Plant.*

Root stock tuberous, with pear shaped tubers, and numerous long fibres, stem climbing, brown, and smooth; leaves cordate, on long foot stalks, the lower ones hastate; peduncles axillary, two flowered, one opening at a time; corolla crimson, tube four times longer than the calyx, limb in five plaits; stamens five, exserted; capsule two celled, cells two seeded. By L. its source is ascribed to the Ipomea purga, and by E. to the Ipomea jalapa.

Jalap has been known in Europe since 1609 ; its name is derived from the Mexican town Jalapa, whence it is imported; it grows on the east side of the Andes, at an elevation of 6000 feet, and flowers in August; the tubers are collected during spring, and the larger ones often sliced in their length, or cut into halves or quarters, to favour their drying ; they vary in size from a closed hand to a nut, are covered by a dark brown thin cuticle, and should be hard and difficult to powder ; their section is deep yellowish grey with darker concentric circles; their odour is faint but nauseous ; when powdered, jalap is pale brown, it tastes disagreeably and acrid. The tubers are very liable to be worm eaten, these insects devour the starch, leaving the resin, hence it becomes more active and better fitted to make extract from ; Guibourt states, that jalap contains resin 17·6, liquid sugar and deliquescing salts 19·, brown saccharine extract 9·, gum 10·, starch 18·8, woody fibre and loss 25·, in 100 parts ; its resin is soluble in spirits of wine, unlike scammony it does not form an emulsion with milk, and by strong sulphuric acid it becomes crimson in a short time.

ADULTERATIONS.—On the continent a light jalap with rose odour is met with, produced by the *Ipomea orizabensis*, and in this country the powder is often mixed with saw dust for those who prefer cheap drugs.

EFFECTS.—A strong cathartic, producing copious liquid discharges, and liable to cause nausea, griping, and sometimes vomiting ; it stimulates the secretions and action of the intestines, and is less irritating than gamboge ; Pereira regards it as perfectly safe, but like all purgatives, an over dose may prove disagreeable, if not dangerous, and injure delicate persons. It is employed for children, often with other aperients, and is much used as a vermifuge ; as an ordinary cathartic, it is a favourite remedy given in a bolus, alone or with calomel; and for cerebral affections as serous apoplexy, hydrocephalus, &c. which are benefitted by hard purging, this combination is frequently prescribed ; in dropsies where watery evacuations are desirable, jalap and cream of tartar is a favourite remedy, it is best calculated for ascites, and slight attacks of general anasarca. DOSE.—Gr. x to ʒss of the powder.

Pulvis Jalapæ Compositus, D. L. E. *Compound Jalap Powder.*

Preparation.—D. Jalap powder ℥ij, bitartrate of potash ℥iijss, ginger ℥ss, mix and sieve.

L. E. Jalap ℥iij, bitartrate of potash ℥vj, ginger ʒij, powder and mix. (E. omits the ginger.)

A hydragogue cathartic. *Dose.*—℈j to ʒj in electuary or draught.

Tinctura Jalapæ, D. L. E. *Tincture of Jalap.*

Preparation.—D. Jalap in coarse powder ℥v, proof spirit Oiss, macerate for fourteen days and filter.

L. Jalap ℥x, proof spirit Oij, macerate for fourteen days and strain.

E. Jalap in moderately fine powder ℥vij, proof spirit Oij, make like tincture of cinchona.

Dose.—fʒss to fʒij added to purgative mixtures; it should be made with rectified spirit.

Extractum Jalapæ, L. *Extractum sive Resina Jalapæ*, E. *Extract of Jalap.*

Preparation.—L. Jalap powder ℔iiss, rectified spirit cong. j, macerate four days and strain; boil the residue in water cong. ij down to cong. ss and strain; distil the tincture, and evaporate the decoction until both thicken, mix them and evaporate to a proper consistence. It should be kept both soft for pills, and hard for powdering.

E. Moisten jalap with rectified spirit for twelve hours, then exhaust it by percolation with spirit; distil off the greater part of this, and concentrate the residue over a vapour bath to due consistence.

E. yields a pure resin. *Dose.*—Gr. iij to v.

L. affords a resin mixed with gum, sugar, and starch. *Dose.*—Gr. viij to x.

LABIATÆ. *Labiate Plants.*—Herbs or under-shrubs; stems square; leaves opposite, often containing aromatic oil; flowers in axillary cymes, sometimes solitary; calyx tubular, persistent; corolla bilabiate; stamens didynamous, the two upper sometimes wanting; ovaries four, free; one style with bifid stigma; fruit one to four small nuts; no albumen.

LAVANDULA VERA, D. L. E. *Lavender.*

A shrub; leaves linear or lanceolate, hoary when young; flowers in interrupted spikes, purplish grey; calyx tubular, five toothed, with thirteen to fifteen ribs; corolla, upper lip two lobed, lower three lobed; stamens didynamous, anthers reniform.

Lavender is cultivated for medical use; it grows wild over southern Europe; the flowering spikes are collected in June and July, and yield when distilled with water—

Oleum Lavandulæ, D. L. E. *Oil of Lavender* is pale yellow, fragrant, and has a hot taste; dens 8·7 to 9·; 60℔ of flowers yield about Oj of the oil, which is soluble in rectified spirit, or two parts of proof spirit; foreign oil of lavender has a less agreeable odour, and is employed to adulterate the expensive English oil. It is used chiefly for a perfume.

Spiritus Lavandulæ, L. E. *Spirit of Lavender.*

Preparation.—Fresh lavender ℔iiss, rectified spirit cong. j, (water Oij, L.), mix, and distil cong. j, (Ovij, E.)

Used for making compound camphor liniment; it is generally got by dissolving the oil in spirit.

Lavender Water.—Oil of lavender ʒiv, oil of bergamot ʒij, oil of cloves gtt viij, oil of nutmeg gtt viij, musk gr. iij, spirit of wine Oj, rose water f℥iij, sugar ʒiv, mix. Used as a perfume.

Tinctura Lavandulæ Composita, D. L. E. *Compound Tincture of Lavender.*

Preparation.—D. Oil of lavender fʒiij, oil of rosemary fʒj, cinnamon ℥j, nutmeg ℥ss, cloves ʒij, all bruised, cochineal in powder ʒij, rectified spirit Oij, macerate for fourteen days, and strain.

L. Spirit of lavender Oiss, spirit of rosemary Oss, cinnamon, nutmeg, of each bruised ʒiiss, red sandal wood ʒv; macerate for fourteen days and filter.

E. Spirit of lavender Oij, spirit of rosemary f℥xij, cinnamon ℥j, nutmeg ℥ss, cloves ʒij, all bruised, red sandal wood ʒiij; macerate for seven days and filter through calico.

Used in hysteria, and hypochondriasis, as a stimulant. *Dose.*—fʒj to ij taken in water or upon sugar.

MENTHA VIRIDIS, D. L. E. *Spearmint.*

Root creeping, stem smooth, erect; leaves sessile, unequally serrated, those beneath the flowers resemble bracts; spike cylindrical, loose, in whorls; calyx five toothed; corolla, tube enclosed, limb campanulate, four cleft; stamens four, equal, anthers with two parallel cells; fruit dry.

It grows in marshy places, and is collected when about to flower; its odour is strong and peculiar, and its taste warm; its properties depend on a volatile oil, of which it contains one five-hundreth part; the entire plant is dried for use.

Oleum Menthæ Viridis, D. L. E. *Oil of Spearmint.*—Got by distilling the plant with water; it is pale yellow, of dens. ·914, and composed of $C_{35}H_{28}O$. (Kane). It is used to allay nausea, and relieve colic.

Dose.—Gtt ij to vj suspended with sugar in water.

Infusum Menthæ Viridis, D. *Infusion of Spearmint.*

Preparation.—Dried leaves cut small ʒiij, boiling water Oss; infuse for fifteen minutes, and strain off f℥viij.

Dose.—f℥j to ij, to relieve irritability of the stomach.

Aqua Menthæ Viridis, D. L. E. *Spearmint Water.*

Preparation.—D. Essence of spearmint f℥j, distilled water cong. ss; mix and filter.

L. The dried leaves ℔ij, or fresh leaves ℔iv, or the oil fʒij, proof spirit f℥vij, water cong. ij; distil cong. j.

E. The dried leaves ℔ij, or fresh leaves ℔iv, rectified spirit f℥iij, water cong. ij; prepare as L.

Used as a vehicle for more active remedies.

Essentia (*Spiritus,* L.) *Mentæ Viridis,* D. *Essence of Spearmint.*

Preparation.—D. Oil of spearmint f℥j, stronger spirit f℥ix, mix.

L. Oil of spearmint fʒiij, proof spirit cong. j, water Oj; distil cong. j.

The D. form is useful to prepare the water extemporaneously.

MENTHA PIPERITA, D. L. E. *Peppermint.*

Root creeping; stem smooth; leaves stalked; ovate lanceolate, serrated; flowers in lax spikes, the upper forming a short obtuse spike; calyx tubular, teeth hispid; other characters, as M: Viridis.

It grows in watery places over Europe, and is cultivated in Kent; the herb is collected when about to flower; its odour is well known, its taste is pungent and leaves a cold impression on the mouth during inspiration; its flavour depends on a volatile oil contained in glands, chiefly in the leaves.

Oleum Menthæ Piperitæ, D. L. E. *Oil of Peppermint.*—Obtained by distilling the fresh herb with water; it is colourless or pale green, and has a powerful odour of the plant; dens. ·90; its composition is $C_{21}H_{20}O_{2}$. The English oil is much superior to that procured abroad, the flavour of which resembles turpentine. *Dose.*—Gtt ij to iv, on sugar, as a stimulant.

Essentia (Spiritus, L.) *Menthæ Piperitæ,* D. *Spiritus Menthæ,* E.
Essence or Spirit of Peppermint.

Preparation.—D. Oil of peppermint fʒj, rectified spirit f℥ix, mix.

L. Oil of peppermint fʒiij, proof spirit cong. j, water Oj, distil cong. j.

E. Fresh peppermint leaves ℔iss, proof spirit Ovij, macerate for two days, add water Oiss, and distil Ovij.

Used to form peppermint water; the D. form is preferable, resembling the essence sold in shops. *Dose.*—Gtt v to xxx.

Aqua Menthæ Piperitæ, D. L. E. *Peppermint Water.*

Prepared.—Like aqua menthæ viridis.

Used as a vehicle for other remedies, and occasionally as a carminative.

MENTHA PULEGIUM, D. L. E. *Pennyroyal.*

Stems prostrate, roots creeping, leaves small, ovate, with pellucid dots, and slightly hairy; whorls all remote, globose, many flowered; calyx hispid, bilabiate.

Pennyroyal grows on wet commons; the entire plant is employed; its odour is strongly fragrant, and its taste warm and rather bitter; it is supposed popularly to have some effect over the uterus, but medically its preparations are used only as vehicles for other remedies.

Oleum Menthæ Pulegii, D. L. E. *Oil of Pennyroyal.*—Got by distilling the herb with water. Effects similar to peppermint.

Spiritus Menthæ Pulegii, L. *Spirit of Pennyroyal.*

Prepared like spiritus menthæ viridis. *Dose.*—fʒss to fʒij.

Essentia Menthæ Pulegii, D. *Essence of Pennyroyal.*

Preparation.—Oil of pennyroyal f℥j, rectified spirit f℥ix; mix.
Dose.—Gtt v to xv.

Aqua Menthæ Pulegii, D. L. E. *Pennyroyal Water.*

Obtained like aqua menthæ viridis.

ROSMARINUS OFFICINALIS, D. L. E. *Rosemary.*

A shrub; leaves sessile, margins revolute, hoary beneath; flowers few, in short axillary, opposite racemes; calyx bilabiate, the lower lip bifid; corolla lavender coloured, bilabiate, its lower lip trifid, the middle lobe large, concave, and hanging down, throat inflated; stamens two, parallel with the under lip; achenia smooth.

Rosemary grows wild in southern Europe; its flowering tops are used; they have a strong odour and a warm bitter taste, from containing volatile oil; it is used as an addition to liniments and perfumes.

Oleum Rosmarini, D. L. E. *Oil of Rosemary.*—Got by distilling the tops with water; it is colourless, of dens. ·89; its composition is $C_{45}H_{38}O_2$. (Kane.)

Essentia Rosmarini, D. *Spiritus Rosmarini*, L. E. *Essence or Spirit of Rosemary.*

Preparation.—D. Oil of rosemary f℥j, rectified spirit f℥ix; dissolve.
L. Oil of rosemary f℥ij, rectified spirit cong. j, water Oj; distil cong. j.
E. Rosemary tops ℔iiss, rectified spirit cong. j; distil Ovij.

Used for soap liniment and compound tincture of lavender.

Origanum Vulgare, L. E. *Common Marjoram.*

Stem erect; leaves stalked, ovate obtuse; spikes oblong, clustered in panicles; bracts ovate, longer than the calyx, which is five toothed, and ten to thirteen nerved; upper lip of corolla nearly erect, the lower trifid; stamens four, anther cells divergent; achenia smooth.

This plant is indigenous, flowering in July; the whole plant is used; it has a strong aromatic odour and warm pungent taste; it contains tannin, and volatile oil.

Oleum Origani, L. E. *Oil of Marjoram or Thyme.*—Procured by distillation with water; this oil is red, but by re-distilling can be got colourless, dens. ·86; it is used to allay tooth-ache, and mixed with olive oil as a stimulating liniment.

Melissa Officinale, E. *Common Balm.*

Herbaceous; leaves ovate, cordate at base, crenate; flowers white, in one sided axillary racemes; calyx bilabiate; corolla, upper lip erect, lower spreading; stamens four.

It grows wild in the south of France, and is cultivated in this country; its odour resembles lemon, and its taste is aromatic; it was formerly employed in infusion, termed balm tea, being considered emmenagogue and diaphoretic,

Marrubium Vulgare, L. *White Horehound.*

Stem bushy and hoary; leaves ovate, crenate, woolly; flowers in dense whorls; calyx with ten acute, recurved teeth; corolla, upper lip erect, lower trifid; stamens didynamous.

Horehound grows in waste places over Europe, it is aromatic and very bitter, and was once much used in chronic catarrh; candied horehound is sometimes employed as a domestic remedy, but the preparation sold as such, is usually composed of extract of gentian with sugar.

SCROPHULARINEÆ. *Figworts.*—Herbs or shrubs, leaves opposite or alternate, exstipulate; calyx tubular, four or five cleft, permanent; corolla irregular, imbricate; stamens didynamous, or two; ovary two celled, ovules many; stigma two lobed; fruit twocelled; seeds albuminous.

DIGITALIS PURPUREA, D. L. E. *Foxglove.*

Biennial, root fibrous; in the first year a tuft of radical leaves arise, from which next year an erect stem springs up, one to four feet high, leafy, slightly angled and downy; leaves alternate, ovate lanceolate or oblong, crenate, downy on the under surface, tapering into winged foot-stalks; raceme terminal, flowers pendulous on one side; calyx five parted unequally; corolla purple, marked with round white spots and hairy within, sometimes in gardens, it is cream coloured; its form is campanulate, inflated beneath; limb obliquely four or five lobed unequally; stamens didynamous; capsule ovate, many seeded.

Foxglove grows wild about hedges, flowering in June; its leaves (and seeds, L.) are used; the leaves should be gathered in the second year, just before or during flowering, and at once dried in a dark room or stove, the petiole ought then to be removed and the rest kept in coarse powder, closed in bottles, and in the dark; they require renewing every year; the seeds are rarely employed, they are collected when ripe, and are round, small, and greyish brown. Digitalis contains some volatile oil, colouring, starch, gum, &c., with a bitter principle digitaline, on which its activity depends, this is a white, neutral, bitter powder, inodorous, soluble in spirit, and sparingly dissolved by water, it causes severe sneezing, like veratrine.

ADULTERATIONS.—Verbascum leaves are sometimes collected instead of foxglove, but they are downy on both surfaces; and the leaves of the scrofularia nodosa, which may also be mistaken for digitalis, are distinguished by being quite free from down.

USES.—Large doses cause vomiting, purging, extreme debility, fainting, coma, and death; small repeated doses produce increased secretion of urine, and nausea, and diminish the force and frequency of the heart's pulsations; combining foxglove with other diuretics has much influence in determining its action on the kidneys, and some have even stated that it operates only when dropsy is present; its effects are best seen in anasarca, from diseased heart or kidneys, in lax habits, with pale surface and feeble pulse, for which a favourite prescription is squill, blue pill, and digitalis, pushed so far as slightly to affect the gums.

Its action on the heart has led to its employment in cardiac diseases; it is useful in constriction of the aortic, or auriculo-ventricular apertures; for by lessening the number and increasing the duration of the muscular contractions, it slowly passes more blood through the strictured part, than the violent and irregularly beating heart can do; and it also allays the dyspnœa and distressing palpitations that disturb the patient. All stimulants and excesses should be avoided during its employment, for an over-distended stomach, fright, wine, &c., will accelerate the heart and undo all the benefit of digitalis; as soon as the heart beats quietly the drug may be omitted, and it will continue to act slowly until again disturbed by some irritation. In regurgitant heart diseases, the excessive action is often an effort to compensate for the diminished supply from regurgitation, and digitalis is sometimes injurious, but there are cases where, with caution, it may be used to allay over-irritability; and in hæmoptysis, from cardiac disease, it is often of service combined with acetate of lead; for functional palpitations of the heart it is less useful than was once supposed; in aortic aneurism it is sometimes given to favour coagulation of blood in the sac, and a few successful cases are recorded from this treament.

The continued use of digitalis in small doses may cause alarming effects, as giddiness, convulsions, and fatal syncope; hence it is termed an accumulative drug; these symptoms are liable to occur from any sudden exertion, and appear to be preceded by slowness of the pulse; when this is perceived, its use should be discontinued, or carefully watched. Dr. Corrigan and others have given it for epilepsy not dependant on organic disease, with some success; f℥j of the infusion is directed every night, this is increased to f℥iss after a week, and again to f℥ij, and continued until it causes nausea, dilated pupils, or some poisonous action, it is then diminished by f℥ss, and continued for two or three months.

ANTIDOTES.—Emetics should at once be used; afterwards infusions containing tannin, and stimulants, are freely given.

DOSE.—Gr. ss to gr. iss, repeated every four or six hours.

Infusum Digitalis, D. L. E. *Infusion of Digitalis.*

Preparation.—D. Dried foxglove leaves ʒj, boiling water f℥ix, infuse for one hour and strain off f℥viij.

L. The dried leaves ʒj, boiling water Oj, infuse for four hours, strain and add spirit of cinnamon f℥j.

E. The dried leaves ʒij, boiling water f℥xviij, spirit of cinnamon f℥ij, prepare as L.

Dose.—f℥ss to f℥j. When well made it is the best way of using foxglove; the E. form is double the strength of the others, and D. omits, very properly, the spirit of cinnamon.

Tinctura Digitalis. D. L. E. *Tincture of Digitalis.*

Preparation.—D. L. Foxglove leaves dried and in coarse powder ℥v, (L. ℥iv,) proof spirit Oij, digest for fourteen days, express, and filter.

E. Made as L., using the leaves in moderate fine powder, and macerate for seven days; it is best made by percolating; if f℥40 be passed through, its dens. is ·944, and f℥j contains gr. xxiv of solid extract.

Dose.—Gtt x carefully increased to gtt xxxx:

Extractum Digitalis, L. E. *Extract of Digitalis.*

L. The fresh leaves ℔j, bruise them, sprinkled with water, in a stone mortar, express and evaporate the juice, unstrained, to a proper consistence.

E. Made as extract of conium.

It requires careful preparation. *Dose.*—A quarter of a grain to gr. j, gradually increased.

Pilulæ Digitalis et Scillæ, E. *Digitalis and Squill Pills.*

Preparation.—Digitalis one part, squill one part, aromatic electuary two parts, conserve of roses enough to form a pill mass; divided into gr. iv pills.

A good diuretic, but best made extemporaneously. *Dose.*—One or two pills.

SOLANACEÆ. *Night Shades.*—Herbs or shrubs; leaves alternate, sometimes collateral; flowers often from the axils, no bracts; calyx persistent, inferior; corolla usually regular, five-cleft, plaited; stamens on the corolla; ovary two-celled; stigma simple; fruit capsular or berried, in two or four cells; seeds many; embryo usually curved, albumen fleshy.

HYOSCYAMUS NIGER, D. L. E. *Henbane.*

Biennial, sometimes annual; in the first year arises a tuft of leaves, petiolated, woolly, with little odour or clamminess; next year, another set of leaves spring, attached to a flower-stem, one to three feet high, covered with viscid hairs; leaves sessile, amplexicaul, sharply lobed, downy, and viscid, of pale green colour; flowers nearly sessile, axillary, erect; calyx tubular, five-cleft; corolla funnel-shaped, unequally lobed, straw-coloured, with purple veins: capsule a pyxidium, two-celled.

Henbane is indigenous, and also cultivated for medical use; the biennial plant should be preferred; when it is annual its flowers are pale without purple veins; the herb has a strong fetid odour, feels clammy, and tastes slightly acrid; its leaves ought to be dried at a heat not above 120°, and kept in the dark; after drying they loose nearly all their smell. Brandes found an alkaloid, hyoscyamine in them; it resembles atropine, and when applied to the eye, dilates the pupil.

EFFECTS.—In large doses it produces a state like insanity, ending in paralysis, and, occasionally convulsions, or pain and purging. Medically it acts as an anodyne, but is far inferior to opium, from which it is distinguished by not stimulating when given in small doses, nor constipating, by dilating the pupils, and in large quantity being apt to cause delirium; it is prescribed to allay spasm, procure rest, and combined with purgatives to prevent griping; stupes containing it are sometimes applied to painful tumors, ulcers, &c.

DOSE.—Gr. iij to x of the powder; seldom used.

Extractum Hyoscyami, D. L. E. *Extract of Henbane.*

Preparation.—D. L. Made like extract of belladonna; E. of conium.

Dose.—Gr. ij to v, added to pill masses; sometimes employed for ulcers, alone or in ointment, and prescribed in lotions to relieve the intolerance of light in strumous ophthalmia; it is often useless from over-heating, or being kept too long.

Tinctura Hyoscyami, D. L. E. *Tincture of Henbane.*

Preparation.—The dried leaves in coarse powder ℥v, proof spirit Oij, macerate for fourteen days, and strain. (E. uses a fine powder, digests seven days, or percolates, which yields a better tincture.)

Dose.—fʒss to fʒij.

ATROPA BELLADONNA, D. L. E. *Belladonna.*

This plant has a dark aspect, and is fetid when bruised; root perennial, stems annual, three feet high, round and slightly downy; leaves in pairs of unequal size, ovate acute, smooth, undivided; flowers solitary, axillary, stalked, drooping; calyx permanent, campanulate; corolla twice as long, and also campanulate, greenish, and purple towards its five lobed border; berry violet black, the size of a cherry with a furrow on each side, two celled, having many seeds in a sweet pulp.

It grows wild over Europe, flowering in June, and ripening its fruit in September; the leaves are employed, they should be gathered before the flowers expand, stripped from the stem, dried carefully, and preserved in bottles; they should not be used when more than a year old; in addition to starch, gum, and the usual constituents of vegetables, in contains a poisonous principle, atropine, this forms white, bitter crystals, soluble in alcohol, and slightly in water, composed of $C_{34}H_{23}O_6N$.

EFFECTS.—Belladonna acts as a dangerous poison, causing dryness of the throat, dilated pupils, confused vision, and insensibility; or delirium, varying from wandering, to furious mania; these may end fatally, and such accidents have happened in England by the fruit being sold instead of cherries, from which they are known by having a permanent calyx, and containing many little seeds. In small doses it is used internally for painful diseases such as neuralgia, and in tetanus it has been given with benefit, at least for chronic cases, but a remedy for acute tetanus is yet to be discovered; in hooping cough it is prescribed with some success, probably from relieving spasm, and is best suited for the advanced disease when all gastric irritation has been allayed; the homœopathists have stated that it causes dryness of the throat, with an eruption like scarlatina, and hence must be a preservative from that disease, this appears unsupported by any facts beyond mere assertion, and its distinct failure in several instances, shew that it has no such power.

Externally it is more used; its extract applied around the eye, dilates the pupil, it is hence employed in iritis to prevent adhesions to the lens, or break them if already formed, it also relieves the nocturnal pain in this disease; in incipient cataract, its application will often increase the power of vision for a time, and in extracting the lens, some smear it previously on the eye brow; for prolapse of the iris, it is used to draw the iris from the aperture in the cornea, but this is not always desirable, as the prolapsed part acts as a plug to fill up the cavity, and accelerates its healing. For rigidity of the os uteri during labour, the extract has been employed abroad, a practice seldom if ever followed here, and dangerous from its liability to become absorbed.

Atropine is sometimes dropped into the eye in solution to dilate the pupil, it acts within five to fifteen minutes, and its effects last three or four days; in iritis the extract is preferable for allaying nocturnal pain.

DOSE.—Gr. j of the powder; this or any preparation of belladonna used internally, should be slowly increased until its effects are observed, in dryness of throat and dilated pupils.

Extractum Belladonæ, D. L. E. *Extract of Belladonna.*

Preparation.—D. Bruise the fresh leaves, express their juice and let it stand for twenty-four hours; pour off and keep the clear liquor; wash the sediment on calico, with an equal bulk of water, and mix the washings with the decanted liquor. Apply a water heat, when coagulation occurs, skim off the coagula, filter the hot liquid through flannel, mix in the washed sediment, and evaporate to an extract by a steam or vapor bath, constantly stirring.

L. E. Bruise the fresh leaves sprinkled with water (filter E.) and evaporate to an extract.

Dose.—The fourth of a grain, gradually increased to half a grain, and repeated every four or six hours until some effect is produced; its quality is very variable.

Tinctura Foliorum Belladonnæ, D. *Tincture of Belladonna.*

Preparation.—The dried leaves in coarse powder ℥v, proof spirit Oij, macerate for fourteen days, strain, press, and filter.

Dose.—Gtt xx to xxx.

Emplastrum Belladonnæ, D. L. E. *Plaster of Belladonna.*

Preparation.—Resin plaster ℥iij (℥ij D.) melt and add extract of belladonna ℥iss, (℥j D.) and mix.

Employed to relieve neuralgic pains, to allay palpitation of the heart, and applied over the sacrum in dysmenorrhœa.

Solution of Atropine.—Atropine gr. vj, dilute nitric acid gtt j, rectified spirit gtt x, distilled water fʒiij mix. Only used externally.

DATURA STRAMONIUM, D. L. E. *Stramonium.*

An annual, stem branched and leafy; leaves large, dull green, unequal at the base, ovate, acutely sinuated and toothed; flowers axillary; white, sweet scented particularly at night; calyx tubular, five angled, five toothed, deciduous leaving a mark around the base of ovary; corolla funnel shaped, plicate; capsule two celled, each parted by a dissepiment, four valved, prickly, the bulk of a wallnut, with many black seeds.

This plant which is also termed thorn apple, grows over India and is found in waste places in Europe where it seems to have been introduced by gypsies from the East; it flowers in July; all its parts are active, and its leaves have a fetid odour, they should be gathered when the flowers begin to expand, and dried with care, they then loose their smell, but retain a bitter taste; in the shops the stem and leaves are sold, chopped in small pieces of a greenish white colour. D. employs the seeds; when analyzed, it yields about one per cent. of daturine, this alkaloid forms colourless crystals, having a bitter flavour resembling tobacco, it dissolves in alcohol, and strongly dilates the pupil of the eye.

Effects.—In poisonous doses it causes flushing of the face, maniacal delirium, or a state like intoxication, followed by insensibility, sometimes by convulsions and death; smaller quantities produce effects very like belladonna. In medicine it is used for spasmodic asthma, in extract or by smoking the herb; its indiscriminate employment is dangerous, as it may increase the dyspnœa, or lead to apoplexy, or paralysis; it is also prescribed in some nervous affections attended with pain.

DOSE.—Of the leaves gr. j, of the seeds gr. ss, thrice daily, gradually increased until some effect is produced.

Tinctura Stramonii, D. *Tincture of Stramonium.*

Preparation.—Bruised stramonium seeds ℥v, proof spirit Oij, macerate for fourteen days, strain, press, and filter.

Dose.—Gtt xx to xxx gradually increased.

Extractum Stramonii, L. E. *Extract of Stramonium.*

Preparation.—L. Take the seeds ℥xv, boiling water cong. j, macerate for four hours, then bruise the seeds in a stone mortar, and boil them with the liquid down to Oiv, strain while hot and evaporate to an extract.

E. Grind the seeds in a coffee mill, and percolate the powder with proof spirit until it passes through nearly colourless; distil off the spirit, and evaporate the residue to a proper consistence.

Dose.—A quarter of a grain, gradually increased; the E. form is preferable, being most active.

NICOTIANA TABACUM, D. L. E. *Tobacco.*

Stem three to six feet high, branched, viscid; leaves sessile, oblong lanceolate, slightly hairy; flowers in terminal panicles with bracts; calyx tubular, hairy; corolla rose coloured, funnel shaped, throat inflated, five cleft; capsule two celled, two valved, opening across the top, seeds numerous.

A native of America, now cultivated in many parts of the world, its growth in this land is restricted only by law; for medicine, Virginian leaf tobacco should be used, it is deep mottled brown and clammy. The active principle nicotin is a colourless, volatile, liquid alkaloid, having the odour of tobacco, and an acrid taste, it exists in the proportion of four to twelve parts in 1000, and is composed of $C_{10}H_8N$; by burning the leaves a poisonous empyreumatic oil is obtained.

EFFECTS.—Large doses produce nausea, vertigo, prostration of strength, syncope, convulsions, and paralysis, and death has ensued in three quarters of an hour, and in some instances in eighteen minutes after taking it; even its external use may cause similar effects. With those unaccustomed to it, smoking is followed by giddiness and faintness, but many doubt whether its continued employment is injurious; Prout and others consider that it disorders digestion, and I think I have seen dyspepsia and nervous pulsations caused by it in the heart and abdominal aorta. In medicine, tobacco is prescribed to relax the muscles and relieve spasm, thus in hernia it causes such vital depression that the strangulated parts may often be easily returned; for this purpose the smoke used to be propelled into the rectum, an enema is now preferred, and it should not be employed indiscriminately, as fatal results have often followed its exhibition, particularly with the aged or debilitated; for ileus, Abercrombie highly recommended it, giving gr. xv in an injection, and repeating it within one hour if requisite; for obstinate constipation, and in spasmodic stricture it has also been used; and for tetanus, Dr. O'Beirne and others have found it of some service.

ANTIDOTES.—None known; the poison should be removed as soon as possible and stimulants employed, with artificial respiration, and galvanism over the heart, if necessary.

Vinum Tabaci, E. *Wine of Tobacco.*

Preparation.—Tobacco ℥iij, sherry Oij, digest for seven days, strain, strongly express the residue and filter.

Diuretic in doses of gtt xxx, seldom used.

Enema Tabaci, D. L. E. *Tobacco Enema.*

Preparation.—D. Tobacco leaf ℈j, boiling water f℥viij, infuse for one hour and strain.

L. Tobacco ʒj, boiling water Oj, macerate for one hour and strain.

E. Tobacco gr. xv to ʒss, boiling water f℥viij, macerate for half an hour and strain.

It is to be regretted that these differ so much; not above gr. xv to xx of tobacco ought to be used at once, and fifteen minutes infusion would amply suffice.

SOLANUM DULCAMARA, D. L. E. *Dulcamara.*

Stem shrubby, twining in hedges; lower leaves cordate, the upper halbert shaped, smooth; flowers in racemes, drooping; calyx permanent; corolla rotate, five parted, purple with two green spots at the base of each segment; anthers dehiscing by pores at the apex; berry scarlet, many seeded.

The dulcamara, bitter-sweet, or woody nightshade, flowers in June, its stems are gathered in Autumn when the leaves have fallen, and then dried; their taste is bitter, afterwards becoming sweetish; this depends on a crystalline principle termed picroglycion. Its medical properties are slight, it is used in decoction as a vehicle for other remedies, in chronic skin diseases as eczema and psoriasis, and is said to act as a diaphoretic and diuretic.

Decoctum Dulcamaræ, D. L. E. *Decoction of Dulcamara.*

Preparation.—D. Twigs of woody night shade ℥ss, water Oss, boil for ten minutes, and strain off about f℥viij.

L. E. Dulcamara sliced ʒx (℥j E.) water Oiss, boil down to Oj and strain. *Dose.*—f℥j to iv.

CAPSICUM ANNUUM, D. L. E. *Common Capsicum.*

An annual, two feet high; leaves ovate, on long footstalks; flowers small, white, axillary and solitary; fruit a dry scarlet or yellow berry with many flat seeds, it varies much in size and shape.

It is a native of America, and cultivated here under glass; the powdered berry constitutes red pepper, its activity depends on an acrid oil, which has been named capsicin. Capsicum is much used as a condiment, to aid digestion; its effects are local and of little use as a general stimulant; it is added to pills to prevent griping, and employed in gargles for cynanche maligna, relaxed sore throat, and in scarlatina anginosa; it is also prescribed with tonic infusions for dyspepsia, and abroad is often applied in cataplasms as a local irritant. DOSE.—Gr. j to x in pills.

Tinctura Capsici, D. L. E. *Tincture of Capsicum.*

Preparation.—D. Cayenne pods bruised ℥iss, proof spirit Oj, macerate for fourteen days, strain, press, and filter.

L. E. Capsicum bruised ʒx, proof spirit Oij, digest for fourteen days and filter, (digest for seven days, or prepare from a fine powder of capsicum by percolation, E.)

Dose.—Gtt x to fʒj with bitter infusions, or to disguise the flavour of turpentine in mixtures; for gargles fʒiv may be added to ℥viij of fluid.

EXOGENS, 4*th*. *Monochlamydeæ.*

POLYGONACEÆ. *Buckwheats.*—Herbs, seldom shrubs, branches jointed, leaves alternate, sheathing, forming an ochrea; perianth deeply cleft, persistent, imbricate; stamens definite; ovary superior, ovule erect; nut triangular; embryo in farinaceous albumen.

RHEUM, D. L. E. *Rhubarb.*

The rhubarbs are herbaceous, with perennial rootstocks; stem four to ten feet high, leaves large, usually cordate, edges wavy; calyx petaloid, six parted; stamens about nine; styles three, reflexed; achenium winged, with the withered calyx at its base.

They grow in the north of China, Tibet, and Persia; several varieties are cultivated in Europe; the Rheum Palmatum is the source of English rhubarb, it is supposed to be a native of Mongolia; R: Rhaponticum grows near the Euxine, it is cultivated for its stalks in gardens, and yields some French rhubarb; there is also the R: Compactum and R: Undulatum, natives of Siberia, grown in our gardens, and other species.

The rhubarbs used in this country are of Chinese or English growth; the former are sold as Turkey and East Indian, they grow in Chinese Tartary and Tibet, and are collected in summer from plants at least six years old, the root is peeled, cut in pieces, bored through their centre, and dried in the sun; in the autumn it is brought through Bucharian traders to Kiatchta, to Russian agents by whom it is exchanged for furs; it is then carefully examined, pared to remove any adherent bark, and bored to inspect its condition; all the decayed pieces are rejected, and afterwards burned by the Russians, who export the selected part to Petersburgh, packed in bags; whence it is sent to the rest of Europe.

Turkey Rhubarb is irregularly shaped, being sliced with a knife; some of its pieces are completely, others only in part, perforated; outside they are covered with a yellow dust; the smallest lumps are selected and sold, packed in cotton, and the coarser pieces reserved for powdering; its transverse fracture is uneven and marbled by white and red veins, it has a strong and rather aromatic odour, if chewed it feels gritty, tinges the saliva yellow, and has a bitter slightly astringent taste; its grittiness is caused by raphides or crystals of oxalate of lime contained in its cells; Mr. Queckett, from 100 grains of Russian rhubarb, got 35 to 40 of these crystals; in powder it is bright yellow, and often adulterated with English rhubarb.

East Indian, or Chinese Rhubarb, is brought direct from China, or through some East Indian port; it forms round or cylindrical masses, or flat pieces, with its cortex slightly sliced or scraped off; the larger pieces are often bored, and have pieces of rope in the holes; many of them are heavy and knotty, others are soft, dark, and decayed; its odour is less agreeable, and its powder darker than Turkey rhubarb.

English Rhubarb is grown in Oxfordshire; it is prepared to imitate Turkey rhubarb in irregular sliced pieces, and some of it is sold in cylindrical sticks, five or six inches long; it is light and usually soft and spongy, with a peculiar pink hue, but streaked like other rhubarbs; its taste is mucilaginous and astringent, its odour faint and rather nauseous, and it is slightly gritty, containing only little oxalate of lime; its powder is bright yellow, when kept for some time it attracts moisture, forming a rather pasty mass with a disagreeable smell; it is used to adulterate other kinds of rhubarb in powder.

Composition.—Schlossberger has found colouring, extractive, and resins in it, mixed with tannin, gum, wood, and salts; the colouring or chrysophanic acid forms yellow crystals; in an impure state it was described as rhein and rhabarberine.

EFFECTS.—Small doses are tonic and astringent, and larger ones are mildly purgative; it is stated to affect specially the duodenum, but rather seems to operate on the entire intestinal canal, and after its aperient action the bowels become constipated which is ascribed to its astringent powers. From its mildness, rhubarb is much employed for the diseases of children that require purging, either alone or with other remedies, as magnesia, mercurials, scammony, &c.; in scrophulous glandular affections it is given in small doses with soda or antimonials; and for diarrhœa caused by irritating food or secretions, rhubarb is of value from its astringing secondary effects; it has not the depleting property of saline cathartics, and is therefore powerless as a remedy in inflammatory diseases; its purgative and colouring matters become absorbed, for the urine and sweat are coloured by it, and the milk of nurses using it is purgative. As a tonic it is is employed in dyspepsia, in pills or in infusion.

DOSE.—As a tonic gr. iij to x; for a purgative gr. xx to ʒj.

Pulvis Rhei Compositus, D. E. *Compound Powder of Rhubarb.*

Preparation.—D. Rhubarb powder ℥ij, magnesia ℥vj, ginger powder ℥j, mix, pass through a fine sieve, and keep in closed bottles.

E. Rhubarb, ℥iv, magnesia ℔j, ginger ℥ij, mix, and keep as D.

Known as Gregory's powder; it forms a useful antacid purgative.

Dose.—℈i to ij; mixed with sufficient fluid.

Infusum Rhei, D. L. E. *Infusion of Rhubarb.*

Preparation.—D. Rhubarb in thin slices ʒij, boiling water f℥ix, infuse for one hour and strain off f℥viij.

L. Rbubarb sliced ʒiij, boiling water Oj, macerate for two hours and strain.

E. Rhubarb in coarse powder ℥j, boiling water f℥xviij, infuse for twelve hours, strain, and add spirit of cinnamon f℥ij.

On cooling it becomes turbid; full doses, as f℥ij or iij are mildly purgative, and moderate ones operate as a tonic; alkalies are often added to the infusion, they render it reddish, but strong acids precipitate an insoluble compound, and are therefore incompatible with it.

Tinctura Rhei Composita, D. L. *Tinctura Rhei,* E. *Tincture of Rhubarb.*

Preparation.—D. Rhubarb ℥iij, cardamoms ℥j, liquorice root ℥ss, all bruised, saffron chopped fine ʒij, proof spirit Oij, macerate for fourteen days, strain, express, and filter.

L. Rhubarb sliced ℥iiss, liquorice bruised ʒvj, saffron ʒiij, ginger sliced ʒiij, proof spirit Oij; macerate for fourteen days and strain.

E. Rhubarb in moderately fine powder ℥iiiss, bruised cardamoms ℥ss, proof spirit Oij, prepare like tincture of cinchona.

Dose.—f℥ss to f℥j, as a purgative; fʒj to iij, for a tonic.

Tinctura Rhei et Aloes, E. *Tincture of Rhubarb and Aloes.*

Preparation.—Powder rhubarb ℥iss, socotrine or East Indian aloes in powder ʒvj, bruised cardamoms ʒv, proof spirit Oij, prepare as tincture of cinchona.

Stronger and more disagreeable than the simple tincture.

Dose.—f℥ss to f℥j.

Tinctura Rhei et Gentianæ, E. *Tincture of Rhubarb and Gentian.*

Preparation.—Powdered rhubarb ℥ij, gentian in coarse powder ℥ss, proof spirit Oij, prepare as tincture of cinchona.

Tonic and slightly aperient. *Dose.*—fʒj to iij.

Vinum Rhei, D. E. *Rhubarb Wine.*

Preparation.—D. Rhubarb ℥iij, canella ʒij, both in coarse powder, sherry Oij, macerate for fourteen days, strain, press, and filter.

E. Rhubarb ℥v, canella ʒij, both in coarse powder, proof spirit f℥v, sherry Oj f℥xv, digest for seven days, strongly express and filter.

A tonic purgative. *Dose.*—f℥ss to f℥j.

Pilulæ Rhei, E. *Rhubarb Pills.*

Preparation.—Rhubarb powder nine parts, acetate of potash one part, conserve of roses five parts; mix, and divide into gr. v pills.

Pilulæ Rhei Compositæ, D. L. E. *Compound Rhubarb Pills.*

Preparation.—D. Rhubarb powder ℥iss, hepatic aloes ʒix, myrrh in powder ʒvj, Castile soap ʒvj, mix and add oil of peppermint fʒj, treacle, by weight ℥ij; beat into a mass.

L. Rhubarb ℥j, aloes ʒvj, myrrh ℥ss, soap ʒj, oil of caraway fʒss, beat into a mass with syrup.

E. Rhubarb twelve parts, aloes nine parts, myrrh six parts, Castile soap six parts, oil of peppermint one part, conserve of roses five parts, mix thoroughly, and divide into gr. v pills. If preferred the peppermint may be omitted,

A mild purgative. *Dose.*—Gr. x to xx in pills.

Pilulæ Rhei et Ferri, E. *Rhubarb and Iron Pills.*

Preparation.—Dried sulphate of iron four parts, extract of rhubarb ten parts, conserve of roses five parts, mix, and divide into gr. v pills.

Dose.—One to four pills.

Extractum Rhei, D. L. E. *Extract of Rhubarb.*

Preparation.—D. E. Rhubarb in thin slices ℔j, water Oiij, macerate for twenty-four hours, strain through cloth, and express; macerate the residue in water Oij, for twelve hours, strain through the same cloth, and press strongly; if necessary, filter the liquids, and evaporate in a vapour bath, to an extract. (It is got better by evaporating in vacuo, E.)

L. Rhubarb powder ℥xv, proof spirit Oj, water Ovij; macerate for four days, with gentle heat, strain, let the dregs subside, and evaporate the clear fluid to an extract.

It requires much care in preparing. *Dose.*—Gr. v to xx.

THYMELACEÆ. *The Mezereons.*—Shrubs with tenacious bark, leaves simple, calyx inferior, coloured, tubular, limb four to five cleft, stamens definite; ovary with one pendulous ovule; fruit a nut or drupe.

DAPHNE MEZEREUM, D. L. E. *Mezereon.*

A shrub with upright branches; leaves lanceolate, appearing after the fragrant flowers, which are in little tufts; perianth four cleft, crimson; stamens eight; berry red, fleshy.

Mezereon is cultivated in gardens; the bark of its root is employed medically; this is in tough fibrous white strips, with a brown epiderm; its taste is sweetish, and afterwards highly acrid; when fresh, it has a slight odour; it contains an acrid resin, and a neutral bitter substance termed daphnin. The berries have often produced dangerous effects with children, and even death has occurred from using them; the dried bark was considered efficacious in syphilitic eruptions and nodes; it is now deemed nearly inert, although some employ it for rheumatic and venereal pains.

Decoctum Mezerei, E. *Decoction of Mezereon.*

Preparation.—Mezereon bark in chips ʒij, liquorice bruised ℥ss, water Oij; boil down to Oiss, and strain. *Dose.*—f℥iv to viij.

MYRISTICACEÆ. *The Nutmegs.*—Tropical trees, with acrid red juice; flowers diœcious; calyx trifid, valvate; ovary free, ovule erect; fruit two valved; seed enveloped in an aril; albumen veined, embryo small.

MYRISTICA MOSCHATA, D. L. *The Nutmeg Tree.*

A tree, thirty feet high, like the pear; leaves faintly aromatic; male flowers small, in axillary racemes; female flowers usually solitary and axillary; fruit like a peach, splitting into two fleshy valves, and displaying the orange aril, termed mace, round the nut. It is termed Myristica Officinalis by E.

This tree is a native of the Spice Islands, but it has been introduced into various other settlements; in preparing nutmegs, the mace is removed and dried, when it becomes yellow and brittle; the nutmegs are also dried with care, and dipped in lime and water to to preserve them; they consist of an outer brown tunic or testa, marked by the mace, an inner endopleura which dips into the white oily albumen, marbling it, two thick cotyledons, and the small embryo. According to Bonastre, 100 parts of nutmeg contains fat oil 31·6, volatile oil 6·, woody fibre 54·, gum, starch, and acid 4·4; they have been sometimes sold after distilling out the volatile oil, this is known by the lightness of the nut, and its want of perfume. They are used for flavouring, and in large doses are slightly narcotic; some persons appear more susceptible of their effects than others.

Oleum Myristicæ, D. L. E. *Essential Oil of Nutmegs.*—Got by distilling nutmegs with water; it is colourless or yellow, with a strong odour of the nut. Used to prepare the essence.

Myristicæ Adeps, E. Expressed oil of nutmegs, or oil of mace, is brought from the Moluccas, in solid fragrant cakes, of orange colour; it is got by heating the nutmegs and pressing them; this substance is a mixture of an oil like tallow, volatile oil, and colouring; it is used in unguentum picis, and sometimes for stimulating liniments.

Essentia Myristicæ, D. *Spiritus Myristicæ,* L. E. *Spirit of Nutmeg.*

Preparation.—D. Oil of nutmeg fʒj, stronger spirit f℥ix; mix.

L. E. Nutmeg bruised ℥iiss, proof spirit cong. j, water Oj; distil cong. j.

Added to mixtures, as the mistura ferri composita. *Dose.*—fʒj to ij.

LAURINEÆ. *Laurels.*—Trees, leaves alternate, evergreen; perianth four to six cleft, imbricated; stamens perigynous, definite, fertile and barren alternately; anthers two to four celled, with valves; ovary superior, with one to three pendulous ovules; fruit fleshy.

CINNAMOMUM ZEYLANICUM, D. E. *The Cinnamon.*

A tree, thirty feet high, leaves ovate or ovate oblong, triple nerved; flowers in panicles usually bisexual; perianth six cleft, the upper part deciduous; stamens twelve in four rows; nine outer fertile; fruit a berry. By L. it is termed Laurus Cinnamomum.

It is a native of Ceylon, cultivated in gardens chiefly around Colombo; the trees are cut when six years old, and those branches that are half an inch to three inches in diameter are peeled, by making longitudinal incisions in them; next day the epiderm and greenish pulp under it are scraped off, and the bark curves up in quills while drying, which are sorted according to their qualities and made into bundles for exporting. The best Ceylon cinnamon is in slender smooth quills, composed up of smaller ones within the larger, each about the thickness of drawing paper, of peculiar brown colour, and well known flavour; it contains volatile aromatic oil, tannin, colouring, wood, &c. Cinnamon is employed in medicine for its agreeable taste, and as it has some tannin it enters into almost every astringent preparation of the colleges. DOSE.—Gr. x to xxx, in powder.

Oleum Cinnamomi, D. L. E *Oil of Cinnamon.*—Is brought from Ceylon, and got by distilling the bark with water; it is red or yellow, highly fragrant, and tastes sweetish, but afterwards acrid; it is a hydruret of cinnamyle $C_{18}H_7O_2+H$. becoming, when oxidized, cinnamic acid, which is found in balsam of tolu, and resembles benzoic acid.

Essentia Cinnamomi, D. *Spiritus Cinnamomi,* L. E. *Spirit of Cinnamon.*

Preparation.—D. Oil of cinnamon f℥j, rectified spirit f℥ix; mix.

L. Oil of cinnamon fʒij, proof spirit cong. j, water Oj; distil cong. j.

E. Cinnamon in coarse powder ℔j, proof spirit Ovij; macerate for two days, add water Oiss, and distil Ovij.

Used to form cinnamon water, and added to mixtures. *Dose.*—fʒj or ij, of L. or E.; or a few drops of D.

Aqua Cinnamomi, D. L. E. *Cinnamon Water.*

Preparation.—D. Essence of cinnamon f℥j, distilled water cong. ss; mix and filter.

L. Cinnamon bruised ℔iss, or its oil ʒij, proof spirit f℥vij, water cong. ij; distil cong. j.

E. Cinnamon bruised ℥xviij, rectified spirit f℥iij, water cong. ij; distil cong. j.

An aromatic vehicle for other remedies.

Tinctura Cinnamomi, L. E. *Tincture of Cinnamon.*

Preparation.—Cinnamon bruised ℥iiiss, proof spirit Oij; macerate for fourteen days and filter (digest for seven days or percolate, E.)

Dose.—fʒj or ij, added to astringent or tonic mixtures,

Tinctura Cinnamomi Composita, D. L. E. *Compound Tincture of Cinnamon.*

Preparation.—D. Cinnamon ℥ij, cardamoms ℥j, ginger ℥ss, bruise, and add proof spirit Oij; macerate for fourteen days and strain.

L. Cinnamon ℥j, cardamoms ℥ss, long pepper ʒiiss, ginger ʒiiss, bruise, and add proof spirit Oij; macerate for fourteen days and strain.

E. Cinnamon ℥j, long pepper ʒiij, both in fine powder, cardamoms bruised ℥j, proof spirit Oij; digest seven days; it is better made by percolating.

A warm aromatic. *Dose.*—fʒj or ij.

Pulvis Cinnamomi Compositus, L. *Pulvis Aromaticus*, D. E.
Aromatic Powder.

Preparation.—D. Cinnamon ℥ij, ginger ℥ij, cardamoms ℥j, nutmeg ℥j; powder, mix, and pass through a fine sieve.

L. Cinnamon ℥ij, cardamoms ℥iss, ginger ℥j, long pepper ʒss; powder and mix.

E. Cinnamon, cardamoms, ginger; mix equal parts of each in powder.

Dose.—Gr. x to xxx, with other remedies.

Confectio Aromatica, D. L. *Electuarium Aromaticum*, E.
Aromatic Confection.

Preparation.—D. Aromatic powder ʒv, dried saffron in powder ʒss, mix, add syrup fʒv, honey ℥ij by weight, mix and add oil of cloves fʒss.

L. Cinnamon ℥ij, nutmeg ℥ij, cloves ʒj, cardamoms ʒss, saffron ℥ij, prepared chalk ℥xvj, sugar ℔ij; mix into a fine powder, and add water when required.

E. Aromatic powder one part, syrup of orange peel two parts; mix.

Dose.—Gr. x. to ʒj, added to mixtures.

CINNAMOMUM CASSIA, E. *Cassia Bark Tree.*

Cassia bark is brought from China, the plants producing it are probably varieties of that yielding cinnamon, for which it is often sold; the quills are much thicker and larger, of a darker colour, usually single, and having a more pungent but less fragrant odour than genuine cinnamon; their medical properties are very similar.

Oleum Cassiæ.—Oil of cassia is imported from Singapore, it is more fiery than oil of cinnamon, which it resembles.

Spiritus Cassiæ, Aqua Cassiæ, and Tinctura Cassiæ, E.—The spirits, distilled water, and tincture, are got like the corresponding preparations of cinnamon, and used similarly.

CAMPHORA OFFICINARUM, D. E. *Camphor Tree.*

A large tree, strongly smelling of camphor; leaves on long petioles, ovate pointed, with three nerves; flowers hermaphrodite, perianth six cleft; stamens twelve, in four rows, nine fertile; berry round. L terms it the Laurus Camphora.

Camphor is found in many plants; that used in Europe is obtained from the above tree, growing in Japan and China; the wood is chopped and boiled in water which separates the camphor, and when the water cools, it is collected and purified by a coarse sublimation, and exported in small greyish grains; these are remelted in Europe in glass flasks, with some quick lime, and the heat so regulated as to sublime the camphor and condense it in the top of the glass vessels, they are afterwards broken to extract the pure mass, which is often of large size, solid, translucent, and semi-crystalline; its odour is strong and penetrating, and it has a bitter pungent taste; its dens. is ·98, hence it floats on water; in the air it evaporates slowly, it melts at 281°, and burns with a brilliant flame, forming much smoke; camphor is easily powdered by the addition of some spirit of wine, water dissolves little of it, and small fragments will rotate if thrown into this fluid; it is soluble in alcohol, ether, the fixed or volatile oils; its composition is $C_{10}H_8O$; when pure it totally disappears on heating.

EFFECTS.—These are variously stated, perhaps from peculiarities of constitution, those of nervous temperament being most influenced by it, and in part they may be due to the drug itself, which is often deficient in odour or taste when compared with other specimens. In small doses, it acts as a stimulant, and allays nervous excitement, it is therefore employed in hysterical affections, in a weak solution to which ether or ammonia may be added; for fevers, mania, and diseases attended with sleeplessness, full doses of camphor are used as a substitute for opium, or in combination with it, and it is sometimes given with diaphoretic mixtures to promote their effects; but to many its odour is highly disagreeable, while others are extremely fond of it. Aphrodisiac properties have also been ascribed to camphor, hence it is used in painful affections of the urinary organs such as chordee; although some authorities have charged it with even causing stranguary. Externally it is applied in liniments as a local stimulant, and when mixed with mercurial ointment, it renders the latter more fluid, and perhaps easier absorbed. Planche asserts, that with benzoin or ammoniac it forms a soft paste, and the fetid gum resins deprive it of odour.

DOSE.—Gr. v to x in emulsion; smaller doses as gr. ss to gr. j are often given.

Mistura Camphoræ, D. L. E. *Camphor Mixture.*

Preparation.—D. Tincture of camphor f℥j, water Oiij, mix; after twenty-four hours, filter.

L. Camphor ʒss, rub with rectified spirit ten minims, add water Oj, and strain.

E. Camphor ℈j, sugar ℥ss, mix, add sweet almonds peeled ℥ss, beat into a pulp, add water Oj, and strain.

Water dissolves very little camphor, hence it forms chiefly a vehicle for other remedies. *Dose.*—f℥ss to f℥ij.

Mistura Camphoræ cum Magnesia*, E. *Camphor Mixture with Magnesia.

E. Camphor gr. x, carbonate of magnesia gr. xxv, mix and add water f℥vj. Magnesia aids in dissolving camphor, and renders the mixture antacid. *Dose.*—f℥ss to f℥ij.

Linimentum Camphoræ*, D. L. E. *Camphorated Liniment or Oil.

Preparation.—Camphor ℥j, olive oil f℥iv, dissolve (with gentle heat, D.) Applied to old sprains, rheumatic affections, &c.

Linimentum Camphoræ Compositum*, D. L. *Compound Camphor Liniment.

Preparation.—D. Camphor ℥v, oil of lavender fʒij, rectified spirit Oiss, melt and add stronger solution of ammonia Oss.

L. Solution of ammonia f℥vijss, spirit of lavender Oj, mix and distil slowly in a glass retort Oj, and dissolve camphor ℥iiss in it.

Strongly stimulant and rubefacient, used for rheumatic and muscular pains.

Tinctura Camphoræ*, D. L. E. *Camphorated Spirits.

Preparation.—D. Camphor in fragments ℥j, rectified spirit f℥viij, melt.

L. E. Camphor ℥v (℥iiss, E.) rectified spirit Oij; dissolve.

Used for sprains, and to prepare camphor mixture, D.

SASSAFRAS OFFICINALE, D. L. E. *Sassafras Tree.*

A small tree, with rough bark, flowers diœcious, slightly fragrant, in racemes; perianth six parted; stamens nine; the females usually have sterile stamens; drupe like a pea, dark blue. It is termed Laurus Sassafras, by L.

Sassafras grows in the American forests; its wood is white, becoming reddish in the old trees, and slightly aromatic; the root is used, it is imported in logs, having a brownish epiderm, within this are brittle, porous, light brown layers, more fragrant than the tree, and containing one per cent. of aromatic oil. It is sudorific, though seldom used except in the decoctions of sarsaparilla and guaiacum.

Oleum Sassafras, E. The essential oil is got by distillation with water, it is colourless, but becomes yellow when kept; it may be added to compound extract of sarsaparilla, E.

Laurus Nobilis*, L. *Sweet Bay Tree.

Its leaves and berries are officinal in L. The former are aromatic; neither are used at present in medicine.

Aristolochiaceæ. *Birthworts.*—Herbs or shrubs, leaves alternate, often with leafy stipules; flowers dull coloured; calyx tubular or trifid, valvate; stamens epigynous; ovary inferior, three to six celled, many seeded; embryo small, at the base of fleshy albumen.

ARISTOLOCHIA SERPENTARIA, D. L. E.

Virginian Snake Root.

Root-stocks perennial, with many fibres, throwing up flexuous stems, ten inches high;

leaves cordate acuminate, slightly downy; perianth bent like an S, expanded at its extremities, its borders forming an upper and lower lip; anthers six, attached to the style; capsule six angled, six celled.

The root which is used, is collected in the United States; it is aromatic, and tastes warm and bitter, like a mixture of camphor and valerian; its odour is caused by essential oil, and its bitterness depends on slightly acrid extractive matter. Serpentaria was supposed to be a remedy for the bites of rattle snakes, and also used as a stimulant in fevers, and along with, or instead of cinchona, in ague; at present, it is seldom prescribed.

Infusum Serpentariæ, L. E. *Infusion of Serpentaria.*

Preparation.—Serpentaria ℥ss, boiling water Oj, infuse for four hours and strain. *Dose.*—f℥j to ij.

Tinctura Serpentariæ, L. E. *Tincture of Serpentaria.*

Preparation.—L. Serpentaria ℥iiiss, proof spirit Oij, macerate for fourteen days and filter. (E. adds cochineal bruised ʒj, and prepares as tincture of cinchona).

Dose.—f℥j or ij added to tonic mixtures.

Asarum Europæum, L. *Asarabacca.*

Root stock creeping, having several short stems, each with two kidney shaped leaves on long stalks; between these arises a single, drooping, greenish brown flower, with coriaceous three lobed perianth; stamens twelve.

This plant grows in Westmoreland; its leaves, when powdered, were used to excite sneezing and mucous discharge in head-ache, chronic catarrh, and for some cerebral affections; they are now rarely employed.

Dose.—Gr. v to viij.

EUPHORBIACEÆ. *Spurges.*—Herbs, shrubs, or trees, often with acrid milky juice, and alternate, stipulate leaves; flowers monœcious or diœcious, often in an involucre; calyx lobed or absent; corolla of scales, petals, or none; stamens variable; ovary free, two or three celled; ovules single or two, suspended; styles as many as the cells, fruit usually of three dehiscing cells separating from their axis; embryo in fleshy albumen.

CROTON ELEUTERIA, D. E. *Cascarilla or Sweet Wood.*

A small tree; leaves stalked, alternate, ovate acuminate, densely downy underneath; flowers monœcious, in compound axillary racemes, the males above and smallest, females few on short stalks; capsule roundish, minutely warted, with three furrows, three celled, six valved.

Its name Eleuteria is derived from one of the Bahamas, where it is found; the supposed source of the bark was termed *Croton Cascarilla* by L. but it has none of the properties of genuine cascarilla. It consists of irregular shaped fragments, and small quills, sometimes as thick as the little finger; they are heavy and compact, covered by a whitish fissured epiderm, and internally brownish; it breaks with a short resinous fracture, tastes aromatic and bitter, and has an agreeable odour, becoming very fragrant when burned. Cascarilla contains volatile oil, resin, tannin, colouring, starch, wood, and a crystalline white substance, cascarillin, little soluble in water, but when dissolved, rendering it strongly bitter.

USES.—An aromatic tonic with little astringence, prescribed in dyspepsia, and wherever tonics are useful.

DOSE.—Gr. x to xxx of the powder, seldom employed.

Infusum Cascarillæ, D. L. E. *Infusion of Cascarilla.*

Preparation.—D. Cascarilla in coarse powder ℥j, boiling water Oss, infuse for one hour, and strain off f℥viij.

L. E. The bruised bark ℥iss, boiling water Oj, macerate for two hours and strain.

Dose.—f℥ss to f℥ij, to which alkalies or acids may be added.

Mistura Cascarillæ Composita, L. *Compound Cascarilla Mixture.*

Preparation.—Infusion of cascarilla f℥xvij, vinegar of squills f℥j, compound tincture of camphor f℥ij, mix.

Dose.—f℥ss to f℥iss twice or thrice daily in chronic bronchitis.

Tinctura Cascarillæ, D. L. E. *Tincture of Cascarilla.*

Preparation.—Cascarilla in coarse powder ℥v, proof spirit Oij, macerate for fourteen days and filter, (prepare as tincture of cinchona, E.)

Dose.—fʒj or ij added to tonic mixtures.

CROTON TIGLIUM, D. L. E. *Purging Croton.*

A tree fifteen feet high; leaves membranous, three to five nerved, oval oblong, with stellate hairs; petioles short, stipules small; racemes small, terminal, the males at the apex with a five cleft calyx, five petals, and fifteen stamens; females having no petals; capsule obtusely triangular, the size of a hazle nut, covered with small hairs; cells three, each one seeded.

It is indigenous in India and Ceylon; its seeds were employed in medicine, but fell into disuse until croton oil was obtained from them, and they were again brought forward by Mr. Conwell and others in 1819. The seeds resemble castor oil berries; they are often covered with an adhering yellow layer, beneath this is the brown testa containing a brittle inner seed coat and the oily kernel; when pressed they yield about half their weight of oil, the *Oleum crotonis*, D. E., *Oleum tiglii*, L., this is both obtained in England, and imported from abroad; it is viscid, nearly colourless when fresh, becoming yellow or orange red by keeping, its odour is faint and nauseous, its taste acrid, and it contains in 100 parts, 45 of acrid matter, and fifty-five of mild fixed oil; the acrid part is stated by Pelletier to consist of crotonin and crotonic acid, the latter is volatile, it acts as a powerful irritant, and is the chief source of the medical activity of the oil; the nature of crotonin is not fully understood.

USES.—In doses of one or two drops croton oil operates, often within half an hour, as a purgative, bringing away several watery evacuations; its action is not always certain and may be attended with depression, or nausea and griping; it is valuable from the smallness of its dose, and its speedy and powerful effects, it is therefore used in apoplexy, mania, obstinate constipation, and whenever strong and rapid purging is required; in excessive doses it causes symptoms like cholera, with collapse and rapid death. Externally applied it produces an eruption of small pustules, and is used as a counter-irritant in phthysis, bronchitis, chronic pneumonia, &c.; care should be taken in employing it, that none touches the eyes, as it would be liable to cause severe inflammation.

DOSE.—One or two drops, placed on the patient's tongue when he cannot swallow; or made into a pill; or dissolved in spirit.

ANTIDOTES.—None; it should be discharged from the stomach, and oily fluids freely taken to aid its expulsion; afterwards the treatment must be directed to sustain the strength, and meet the gastro-enteric inflammation.

Linimentum Crotonis, D. *Croton Oil Liniment.*

Preparation.—Croton oil f℥j, oil of turpentine f℥vij; mix.
Useful for external application, and sufficiently strong.

RICINUS COMMUNIS, D. L. E. *Castor Oil Plant.*

Root fibrous; stems jointed, hollow; petioles long, with glands at its apex, leaf palmate in seven lanceolate serrate segments; flowers monœcious, in terminal panicles, the female above, articulated to the stalks; perianth three to five cleft; male, stamens numerous; female with a tricoccous spiny capsule, each cell one seeded. Several species are known; in the East it is perennial and often twenty feet high, in this country it is only annual, and seldom grows above four feet.

The seeds are employed to prepare castor oil, there are two varieties of them, one is large, the other which is smaller, is considered to yield more and better oil; they are oval-shaped about the size of a large pea, marbled with grey and dark brown spots and stripes; at their end is the tumid strophiole, and inside is the oily albumen and embryo; Geiger found in 100 parts, twenty-four of seed coverings, and seventy of kernel; the latter yielded forty-six parts of oil, with gum, starch, lignin, and albumen. The oil is got by removing the inert shells and pressing the kernels with or without heat, or boiling them in water, and skimming off the oil as it rises to the surface ; when procured by expression the oil is usually heated in water afterwards, and any albumen, or scum removed by straining, which appears to prevent its turning rancid ; it is a viscid fluid of dens. ·97 ; at 0° it becomes solid ; when saponified, it yields glycerine and ricinic, elaidic, and margaric acids ; it dissolves in pure alcohol or ether, unlike other fixed oils ; the finest kinds have a slight yellow colour, a faint odour and mild taste ; commoner oils are yellow or brown, their smell is nauseous, and they taste acrid and disagreeable ; castor oil is brought chiefly from the East Indies and sold as cold drawn ; the American oil is pale, and in cold weather deposits a white oily substance.

ADULTERATIONS.—Seem rare ; E. states it may be tested by its solubility in an equal bulk of alcohol, but Pereira has lately shewn that castor oil confers on other fixed oils mixed with it the power of dissolving in spirit.

USES.—The seeds are strongly acrid, twenty of them have proved fatal by causing symptoms like cholera, and even two are said to act as a severe cathartic. The oil operates as a mild purgative, commonly within two or three hours, its taste is the chief objection to its use, and often provokes nausea ; it is employed whenever an aperient is required without irritating the bowels, as in inflammatory affections of the intestines or genito-urinary system ; for infants it has been long used, yet it is doubtful whether habitual purgation is necessary either for them or for adults.

DOSE.—f℥ss to f℥j, on some aromatic water, hot milk, or coffee, or in emulsion ; for children fʒj to iv may be used.

Janipha Manihot, D. L. E. *Mandioc or Cassava.*

A shrub, root tuberous and fleshy, with acrid milky poisonous juice ; leaves palmate, in five or seven lanceolate segments, flowers monœcious, in racemes ; calyx campanulate, five parted ; stamens ten round a disk, filaments unequal ; stigmas three, in a rugose mass.

This plant is cultivated in the West Indies and South America ; there are two varieties of it. The bitter cassava is six feet high, it has dark leaves, and is said to contain hydrocyanic acid ; it is grown to make cassava bread, which is prepared by roasting the roots, expressing their juice, and baking the residue ; they also yield tapioca, which is their farina, this is procured by washing the bruised roots with cold water, and when it subsides, it is collected and dried on hot plates until it becomes granular. Tapioca is imported in small angular masses, partially soluble in cold water, and used like other starchy matters for diet ; when in powder it is termed Brazilian arrow root. *Sweet Cassava* is about four feet high, it is boiled and used as a vegetable, or an intoxicating drink can be made from it.

Euphorbium.

The euphorbiums vary in appearance, some resembling the cactus, having jointed angular stems and double spines at their angles; flowers in monœcious heads, consisting of one female, and many male flowers in an involucre of one leaf with five divisions and five alternate glands; female one pistil; capsules three celled, one seeded.

Euphorbium is imported from Mogadore; it is stated to be procured by the inhabitants of the Lower Atlas Range, incising the branches of a euphorbium, and collecting the acrid milky juice as it hardens; while doing so they are obliged to protect their face with a cloth, to prevent the particles from annoying them; it forms dull yellow, friable masses, usually pierced with one or two holes by the prickles of the plants, they have little odour and their taste is burning and disagreeable. Its powder irritates the eyes and nose powerfully, and exposure to it while grinding the drug has produced delirium and convulsions; it enters into some horse blisters, and is used in the acetum cantharidis, E.

PIPERACEÆ. *The Peppers.*—Shrubs or herbs, leaves without stipules; flowers hermaphrodite, in spikes; stamens definite or not; ovary superior, one celled, ovule erect; fruit indehiscent, somewhat fleshy; embryo in a fleshy sac at the end opposite the hilum, outside the albumen.

PIPER NIGRUM, D. L. E. *Pepper Vine.*

Perrennial, stems climbing, dichotomously branched and jointed; leaves ovate acute, five to seven nerved, dark and glossy above; spikes stalked, three to six inches long, drooping, covered with flowers, some of which are male or female, others have both stamens and pistils.

It is cultivated in the East and West Indies, the berries are gathered as they begin to ripen and dried in the sun, when they shrivel and form black pepper; the same plant produces white pepper, which is obtained by soaking the ripe fruit in water, rubbing off its pulp and drying the inner portion, it is also made in England by removing the husk of black pepper with friction. Its acrid and aromatic flavor is due to volatile oil and resin; it also contains piperine, a substance composed of $C_{40}H_{22}O_8N$, this is crystalline, without taste, smell, or colour, and can be procured from long pepper or cubebs; Pelletier considers it is related to the resins, not being an alkaloid. Pepper is asserted to cure intermittent fevers, and this power is considered to reside in the piperine, ʒij of which, in divided doses of gr. vj or viij is said to suffice for removing an ague; pepper has also been employed as a substitute for cubebs.

Confectio Piperis Nigri, D. L. E. *Confection of Black Pepper.*

Preparation.—D. Black pepper in powder ℥ss, powdered liquorice ℥ss, refined sugar ℥j, oil of fennel f℥ss, clarified honey ℥ij by weight, mix and beat into a uniform mass.

L. E. Black pepper ℔j, elecampane ℔j, fennel ℔iij, white sugar ℔ij, powder and add honey ℔ij (E. adds liquorice powder ℔j.)

Employed as a substitute for *Ward's Paste*, a quack remedy used for piles and fistula; Sir B. Brodie considers that it acts as a local stimulant, and should be persevered in for a long time; a simpler formula would be pepper and electuary of senna. *Dose.*—ʒj to ij twice or thrice daily.

Piper Longum, L. E. *Long Pepper*.

A shrubby climber, leaves ovate, upper ones on short petioles, oblong acuminate; peduncles longer than the petioles, spikes nearly cylindrical.

Its spikes are collected in India when unripe and most pungent, and dried in the sun; they are an inch or more in length, having a faint odour and strong pungent taste; their composition resembles black pepper; they enter into several preparations.

Cubeba Officinalis, D. *Piper Cubeba*, L. E. *Cubebs*.

Stem climbing, leaves four to six inches long, oblong, strongly veined and coriaceous; spikes at the end of the branches, diœcious; fruit larger than black pepper, globose, with pedicels.

It is also termed Java pepper from its source; the berries are gathered while unripe, and dried; they have a peculiar smell and acrid spicy taste; analyzed by Manheim, they yielded green and yellow essential oils, a substance similar to piperin, resin, extractive, salts, and wood.

USES.—Cubebs are employed for gonorrhœa, after subduing any inflammatory symptoms, in doses of ʒss to ʒj three or four times daily, if at the end of a week its effects are not decided, it may be omitted and other remedies used; combined with red oxide of iron it is often of service in gleet; when given too freely, cubebs are liable to cause purging, and accomplish less good than more moderate doses, which increase the quantity of urine, deepen its colour, and give it a peculiar odour; care should be taken that its powder is genuine, and recently made, as by exposure to the air it soon deteriorates. For catarrh of the bladder it is occasionally prescribed in small doses as gr. x.

Oleum Cubebæ, D. E. *Oil of Cubebs.*—Got by distilling the powder with water, it is colourless, with a strong odour and taste of the berry; this oil may be substituted for cubebs or added to it. *Dose.*—gtt v to xv.

Tinctura Cubebæ, D. L. *Tincture of Cubebs*.

Preparation.—Cubebs bruised ℥v, rectified spirit Oij, macerate for fourteen days and filter.

Dose.—fʒj or ij added to balsamic mixtures.

ARTHANTHE ELONGATA, D. *Matico.*

The leaves of matico were brought into use by Dr. Jeffreys of Liverpool, in 1839; they have an aromatic odour, like sage, and a warm, bitterish taste; analyzed they yield a volatile oil, resin, and a bitter principle, maticine, with colouring, salts, and woody fibre. Matico is used in powder, or by applying the moistened under surface of the leaf, to check hemorrhage from small vessels, or leech bites; in infusion or tincture it is given both as a styptic and astringent in menorrhagia, melæna, and dysentery; an injection of it is employed in leucorrhœa, epistaxis, and hemorrhages from the urethra, rectum, or uterus; and it is applied to piles, in the form of ointment or stupe.

Infusum Matico, D. *Infusion of Matico.*

Preparation.—Matico cut small ℥ss, boiling water Oss, infuse for one hour, and strain off f℥viij.

Used in lotions or internally.—*Dose.*—f℥ss to f℥ij.

Tinctura Matico, D. *Tincture of Matico.*

Preparation.—The leaves in coarse powder ℥viij, proof spirit Oij, macerate for fourteen days and filter.

Dose.—f℥j to ij for internal use; or f℥j to ij added to f℥viij of a lotion.

URTICACEÆ. *The Nettles.*—Herbs or trees, juice watery or milky; leaves with hairs, often stinging, and stipules; flowers monœcious or diœcious, perianth calyx-like, imbricate; stamens definite; ovary free, cells one or two, each with one ovule; fruit a nut, radicle always superior. The plants of this family are very unlike each other except in the small flowers and fruit.

HUMULUS LUPULUS, D. L. E. *The Hop.*

Perennial, stem annual, climbing from right to left, rough; leaves petiolated, three to five-lobed, veiny; flowers yellowish green; males on a separate plant, a few on the female; females in dense catkins or strobiles, consisting of membranous bracts, each with a flower in their axil; fruit a small one-seeded nut, covered with yellow aromatic glands termed Lupuline.

Hops were introduced into England in the time of Henry VIII; when grown from the root-sets they are in perfection in the third year, they flower in August, and the catkins are gathered the month after, and kiln-dried; their aromatic bitter principle, or lupuline, is in oval, shining, yellow scales, marked by a point of attachment, the hilum; when analyzed, 100 parts of it afford two of volatile oil, said to be narcotic, and ten of a bitter extract, termed lupulite ; ℔vj of hops, by sifting, give ℥iv of lupuline. Its odour is considered anodyne, and a pillow stuffed with hops has been used to procure sleep ; internally its preparations are given with the same intention, and in infusion, or in the form well-hopped porter, it is employed as a tonic.

Infusum Lupuli, L. *Infusion of Hops.*

Preparation.—Hops ʒvj, boiling water Oj, macerate for four hours and strain.

Dose.—f℥j, or ij, as a tonic.

Tinctura Lupuli, L. *Tincture of Hops.*

Preparation.—Hops ℥vj, proof spirit Oij, macerate for fourteen days and strain.

Dose.—fʒj, or ij, added to the infusion.

Tinctura Lupulinæ, D. E. *Tincture of Lupuline.*

Preparation.—Lupuline ℥v, rectified spirit Oij, macerate for fourteen days and filter. (Prepare as tincture of capsicum, E.)

Dose.—fʒj, or ij ; it may be used as an anodyne, being much stronger than the tincture of hops, L.

Extractum Lupuli, L. E. *Extract of Hops.*

Preparation.—Hops ℔ss, boiling water cong. ij, macerate for twenty-four hours, boil down to cong. j, strain while hot, and evaporate to an extract.

Merely a bitter. *Dose.*—Gr. v to xx.

CANNABIS INDICA, D. *Indian Hemp.*

Diœcious, sometimes monœcious, three to ten feet high in different climates ; stem erect, branching, downy, and angular ; leaves scabrous, on petioles, of five to seven narrow leaflets ; males in drooping panicles, perianth five-parted, stamens five ; females in a crowded spike, perianth of one small persistent sepal ; fruit ovate.

The Indian and European hemp appear to be similar, but being thinly sown, and in a warm climate, the former secretes a resin which is used as an intoxicating agent, and some years ago was introduced into England as a remedy ; the natives collect the resin, termed churrus, in central India, and form it into balls ; they also sell the dried plant, and its adherent exudation, under the appellation of gunjah, tied up in bundles. In the East it is eaten or smoked, and produces intoxication, delirium, narcotism, or a state like epilepsy ; in this country its effects have been found uncertain ; it is often inert, at other times it allays pain and causes sleep ; its employment was advised in tetanus, rheumatism, neuralgia, and chorea.

Extractum Cannabis Indicæ Purificatum, D. *Purified Extract of Hemp.*

Preparation.—Dissolve the commercial extract of Indian hemp ℥j, in rectified spirit f℥iv, when the dregs subside, evaporate the clear liquor, by a water bath, to a soft extract.

Dose.—Gr. j, gradually increased to gr. x, observing its effects.

Tinctura Cannabis Indicæ, D. *Tincture of Indian Hemp.*

Preparation.—The purified extract ℥ss, rectified spirit Oss, dissolve.

Dose.—fʒss to ʒj, in emulsion, as water precipitates the resin.

Morus Nigra, L. *The Mulberry.*

A small tree; leaves cordate, serrated, downy; flowers monœcious, unisexual; males in a spike, stamens four; females in ovate catkins, sepals four, becoming fleshy and enclosing the seed; fruit purple.

Mulberries are formed by the collection of several female flowers, the sepals of which have become fleshy, they have an agreeable odour, and acidulous, sweetish taste; they are only used for their colour and flavour.

Syrupus Mori, L. *Syrup of Mulberries.*

Preparation.—The strained juice Oj, sugar ℔ijss, melt. *Dose.*—fʒj to ij.

Ficus Carica, D. L. E. *The Fig Tree.*

Leaves cordate, palmate, scabrous above, downy beneath; flowers monœcious, numerous, enclosed in a fleshy receptacle termed the fig, having a small orifice at the apex, and a few scales at base; males near the aperture, perianth three-lobed, stamens three; females, perianth five-parted, drupe one-seeded, nut fragile.

The fig when unripe contains an acrid juice, which on ripening, is replaced by sugar; it is considered laxative, and used in some preparations.

Ulmus Campestris, L. *The Elm Tree.*

Leaves rough, doubly serrated; flowers perfect, perianth bell-shaped, persistent, stamens five, styles two; ovary two-celled, fruit a samara, with a broad membranous wing all round, seed pendulous.

The inner bark, or liber, is ordered; it should be stripped in spring, and dried after removing the outer layers; it is in tough, thin, brown pieces, without smell, and having a bitter mucilaginous taste; its activity depends on tannin, of which it contains 6·5 per cent.

Decoctum Ulmi, L. *Decoction of Elm Bark.*

Preparation.—The fresh bark bruised ℥ijss, water Oij, boil down to Oj, and strain.

Dose.—f℥iij to vj, thrice daily, as an astringent tonic, and used in some chronic skin diseases.

AMENTACEÆ. Trees or shrubs, young leaves with stipules, flowers monœcious or diœcious, rarely perfect; females solitary or in catkins, ovary usually simple, fruit bony or membranous, no albumen.

TRIBE *Saliceæ.*—Flowers in catkins, fruit naked, two-valved, one-celled, many-seeded, seeds erect, comose.

SALIX CAPREA, E. *The Willow.*

A tree twenty feet high; leaves ovate acute, serrated, pale and downy beneath; catkins very thick, oval; stigmas nearly sessile.

Many varieties are cultivated, and their barks dried for medical use, those being considered best that are most bitter; they contain variable quantities of tannin, and a peculiar principle designated salicine, mixed with the ordinary constituents of plants. Salicine forms white silky needles, very bitter, inodorous, neutral, and therefore not producing salts; it is soluble in cold or hot water, and contains $C_{42}H_{28}O_{22}$, differing from the alkaloids in having no nitrogen; sulphuric acid decomposes it, forming a blood-red liquid; its medical properties are considered similar to quinine, and it is thought less liable to irritate the stomach; it deserves attention, being tolerably cheap. DOSE.—Gr. ij to v thrice daily.

TRIBE *Cupuliferæ.*—Males in a catkin; perianth adherent to the ovary, limb toothed, sometimes deciduous, with a coriaceous involucre.

QUERCUS. *The Oak.*

Monœcious; male catkins lax, stamens five to ten; female solitary, in a cup-like scaly involucre, three celled, two abortive; acorn one-celled, one-seeded.

The *Quercus pedunculata*, D. L. E., is distinguished from other oaks by its acorns being on long peduncles, and its leaves on short stalks; the bark is used, it consists of fibrous reddish strips, with an ash grey epiderm if young and good; it contains fifteen to twenty per cent. of tannin, some gallic acid, and other vegetable matters, and being strongly astringent, is used in gargles for relaxed sore throat, in injections for piles, prolapsus ani, or leucorrhœa, and internally for chronic diarrhœa, or dysentery.

Decoctum Quercus, D. L. E. *Decoction of Oak Bark.*

Preparation.—D. Bruised oak bark ℥iss, water Oiss, boil for ten minutes, and strain.

L. E. The bruised bark ℥x, water Oij, boil down to Oj, and strain.

Dose.—f℥j to iij.

QUERCUS INFECTORIA, D. L. E. *Gall Oak.*

A tree, four to eight feet high; leaves on short stalks, ovate oblong, with a few coarse serrations on each side; acorn solitary, two or three times longer than its cup.

It is a native of Asia Minor, and yields gall nuts; they grow on the buds and sides of its branches, and are caused by the punctures of an insect (diplolepsis, or cynips) depositing its eggs and an irritating fluid, which leads to the formation of the nut, in it the larva becomes developed, when it perforates the gall and escapes. The best or blue galls are greyish coloured, from the size of a pea to a hazel nut, and gathered before the insect has got out; externally they are smooth with tuberculated prominences. White galls are larger, lighter, less astringent, and usually perforated by a hole through which the insect escapes; in 100 parts of galls there are 20 to 46 of tannin, a little gallic acid, with salts, and woody fibre. They may be used whenever a powerful vegetable astringent is indicated, but their constituents, gallic acid and tannin, are becoming employed instead of them; with persalts of iron, galls form a blueish black compound, common ink; this reaction is sometimes used as a test for iron. DOSE.—Gr. v to xx.

Tinctura Gallæ, D. L. *Tinctura Gallarum,* E. *Tincture of Galls.*

Preparation.—Galls in powder ℥v, proof spirit Oij, macerate for fourteen days, and filter. (Prepare as tincture of capsicum, E.)

Dose.—fʒj or ij; diluted with water it is used for gargles, and lotions; or to test the presence of iron in solutions.

Unguentum Gallæ, D. *Gall Ointment.*

Preparation.—Galls in fine powder ʒj, ointment of white wax ʒvij; mix.

Unguentum Gallæ Compositum, L. *Ung: Gallæ et Opii,* E.
Compound Gall Ointment.

Preparation.—L. E. Powdered galls ʒij, opium ʒss (ʒj, E.), lard ℥ij (℥j, E.); mix.

Applied to piles and prolapsus ani as an astringent and anodyne; camphor is often added to it.

ACIDUM TANNICUM, D. $(C_{18}H_5O_6+3\text{Aq.})$
Tannic Acid.

Preparation.—Sulphuric ether Oiij, distilled water f℥v; mix, and percolate in successive portions through galls in powder ℥viij; the liquid which passes through will separate into two distinct strata, the heavier of which is to be separated and evaporated to dryness; finally, applying an oven heat, which should not exceed 212°. From the lighter liquid the ether can be recovered by distilling it off.

It is a white or yellowish porous mass, with a styptic taste, and inodorous; it dissolves in water or proof spirit, its solution reddens litmus, and by exposure to the air becomes changed into gallic acid. Tannin is employed for various affections as a powerful astringent, as in chronic diarrhœa, old catarrhs with excessive secretion, and in phthysis, to allay the irritating cough and expectoration; it is also used in gargles, lotions, and injections, and is applied in the form of ointment to cutaneous eruptions as psoriasis.

DOSE.—Gr. j to v in pill or solution; for lotions, gr. v to x in f℥j of water.

ACIDUM GALLICUM, D. ($C_7HO_5+3Aq.$) *Gallic Acid.*

Preparation.—Make galls in powder into a paste with water, place them on a porcelain dish, and keep them between 60° and 70° for six weeks, replacing the water that evaporates. Boil the residue for twenty minutes with f℥45 of water, and filter through calico; the solution on cooling will give a copious precipitate, drain it on calico and strongly press it in blotting paper, then dissolve in boiling water f℥x; when the solution again cools to 80^c, pour it off from the crystals which have formed, wash them with ice cold water f℥iij, dry them on blotting paper, and then by a steam or water heat. By boiling the rest of the galls in water f℥45, filtering into a capsule, containing the liquor decanted from the crystals in the above process, evaporating to f℥x and cooling to 80°, more crystallized acid will be got.

Or, Take powdered galls ℔j, water Oj, steep for twenty-four hours, place in a percolator and pour over them Oiss of water in successive portions; dilute oil of vitriol f℥v with an equal bulk of water, and when cool, add it to the percolated fluid and stir well. Separate the viscid precipitate on a filter, and to the solution which passes through add oil of vitriol f℥v, and add the precipitate which forms to that already obtained; envelope both in calico and powerfully press them, dissolve the residue in oil of vitriol f℥xvj, diluted previously with water Oiv, boil for twenty minutes, and let it rest for a week. Let the deposit obtained at the end of this time be pressed, dried, and melted in thrice its weight of boiling water, filter if necessary, and when cooled to 80° decant it from the crystals which have formed, wash them with f℥iij of ice cold water, and dry them on blotting paper, then at a heat not above 212°.

As got in these ways, the acid may be made nearly white by dissolving it in twenty times its weight of boiling water, filtering through animal charcoal, evaporating to one-sixth its volume, and cooling to separate the acid.

It forms silky small crystals of acid, styptic taste; soluble in 100 parts of cold, or three of boiling water; like tannin it causes a deep blue colour with persalts of iron, but is distinguished by not precipitating gelatine. Gallic acid does not seem to exist in plants, its source being the decomposition of tannin, by absorbing oxygen and loosing carbonic acid, thus $C_{18}H_8O_8$ tannin,$+8O=2,C_7HO_5+3Aq.$ and $4CO_2$. When taken, its presence is soon detected in the urine by a salt of iron; it is therefore a valuable and direct astringent remedy in hemorrhages of the kidneys or bladder, and has been given in some cases of Bright's disease, it is said with considerable benefit; but it should not be employed when there is any inflammatory action, as in acute dropsy. DOSE.—Gr. iij to x twice or thrice daily in pill or solution.

CONIFERÆ. *The Cone Tribe.*—Branching trees or shrubs, full of turpentine; woody tissue marked by circular disks; leaves simple; flowers monœcious or diœcious; males one, or monadelphous in a deciduous catkin; females in cones, ovary a flat scale, ovules naked, embryo in oily albumen, cotyledons two or many opposite ones. They are subdivided into—

Pines.—Monœcious, males in catkins, with two sessile stamens, anthers one celled; cones closely imbricated, ovaries inverted; leaves two or many in the same sheath. Including the *Pinus sylvestris*, D. L., Scotch fir, which yields turpentine, pitch, and tar; the *P: maratima*, which affords Bordeaux turpentine and tar; and the *P: palustris*, or swamp pine, producing turpentine and tar in the United States.

Firs.—Male catkins solitary, anthers bursting transverse; females, catkins simple, scales imbricated, flat, thin at the apex, when ripe falling from the axis; leaves single in each sheath. Including the *Abies excelsa*, D. L. E., this affords common frankincense, from which is made Burgundy pitch, D. E.; and the *A: balsamea*, Canadian fir, which exudes balsam of Canada.

Larches.—Monœcious; cones lateral, leaves when expanding, in bundles, becoming separate by lengthening of the new branch; cotyledons never lobed. It includes the *Larix Europea*, the source of Venice turpentine.

Terebintha vulgaris, L. is obtained chiefly from the southern American states, it is collected by cutting a hole in the tree and removing its bark above this, when the turpentine exudes into the hollow; it is viscid, yellow, and aromatic, and has a bitter, warm, rather acrid taste; when fresh it contains about seventeen per cent. of oil of turpentine, the rest being resin, often mixed with leaves and impurities. *Bordeaux turpentine* is whitish and turbid; by rest it separates into a transparent liquid, and a granular honey like fluid; it solidifies with the thirty-second part of its weight of magnesia; it is seldom imported.

Venice turpentine, E. should be the exudation of the larch, it forms a thick, greenish yellow, usually cloudy fluid, with a peculiar odour and acrid bitter taste; in general a factitious substance is sold instead of it.

Balsam of Canada, L. E. is got by breaking the vesicles of this substance that form on the branches of the abies balsamea, it is yellow, transparent, as thick as honey, and solidifies when old or exposed to the air; its odour is agreeable; it is used diluted with oil of turpentine as a varnish.

Common Frankincense, L. E. exudes from the abies excelsa, and is collected in opaque deep yellow drops, which are hard and brittle, having lost by evaporation much of its volatile oil; when melted and strained, it forms the true *Burgundy pitch*, D. L. E. but the substance sold as such, is usually composed of resin mixed with water and palm oil, or concrete common turpentine; when genuine it is yellowish white, brittle, softening when heated, and strongly adhesive.

Emplastrum Picis, L. E. *Pitch Plaster.*

Preparation.—L. Burgundy pitch ℔ij, resin ℥iv, wax ℥iv; melt, add resin of spruce fir ℔j, oil of nutmeg ℥j, olive oil f℥ij, water f℥ij, and boil to a proper consistence.

E. Burgundy pitch ℔iss, resin, bees wax, of each ℥ij; gently melt, add oil of mace ℥ss, olive oil f℥j, water f℥j, and boil to a proper consistence.

A stimulating plaster used in chronic catarrhs, and over rheumatic pains.

OLEUM TEREBINTHINÆ, D. L. E. *Oil of Turpentine.*

Is prepared by distilling American turpentine with water; resin remains behind, the water and oil passing over. L. and E. direct it to be purified by re-distillation with four parts more of water. If pure it is a limpid oil, which may be rendered nearly odourless by repeated agitation with alcohol, its taste is hot and bitter, dens. ·86, it should react neutral; turpentine is inflammable, burning with a smoky flame; its composition is $C_{10}H_8$, with water it forms if long kept, or in the cold, large crystals of a hydrated compound; it absorbs muriatic acid gas, and is converted by it into a substance termed artificial camphor.

USES.—In small doses, turpentine is absorbed, and then discharged through the kidneys, promoting diuresis, the urine having a violet odour; it is also exhaled by the lungs and skin as their secretions smell of the drug; in larger doses, it may cause stranguary, hæmaturia, and sometimes suppression of urine with fever; all do not appear equally susceptible of these effects, and large doses as f℥j or ij, rarely if ever, produce them, but are purgative; full doses are also liable to excite intoxication.

Externally it is employed in liniments to rheumatic pains, old sprains, &c.; when applied to the skin on flannels wrung out of the heated oil, it is a speedy and powerful local irritant; it is thus used in congestive attacks of the lungs, as suffocative catarrh and typhoid pneumonia, and in colic, dysentery, peritonitis, and for painful affections generally, as a rapid means of counter irritation; some use cloths wrung out of hot water, and merely sprinkled with turpentine, but they are very inferior to the hot oil in their effects. To burns it is employed in the form of turpentine liniment, and to ulcers, for the purpose of promoting granulations, as warm dressing, of which it is the active part; the surgeon also often employs lint dipped in turpentine to arrest hemorrhage from incised wounds.

Internally turpentine is given in small doses to check capillary bleeding, as of the kidneys or bowels, and in purpura; for chronic mucous discharges it is little employed, although of value in gleet when mixed with an equal quantity of copaiba; as a purgative its action is not always certain, and it is usually combined with castor oil, and prescribed in spasmodic diseases, tympanitic distension of the abdomen, and whenever a stimulating cathartic is necessary; in the tympanitis of fever it is of great benefit in stupes, enemas, or given by the mouth, especially according to Dr. Copland, when there is delirium or coma, for by varying the dose, its stimulant or purgative effects can be produced. In checking the deposition of lymph during inflammation, turpentine appears to have powers next to mercury, though it does not cause its re-absorption so rapidly, or effectually; for iritis, it was recommended by Mr. H. Carmichael, and is given in cases where mercury is not advisable, or where the disease recurs while the patient is salivated; for puerperal fevers, it is of most use where its purgative or antiphlogistic effects are required, and Dr. Copland after considerable trial has stated his opinion that it has greater powers over asthenic inflammations than any other known drug. It often relieves sciatica and neuralgia, its action in these affections is obscure, and probably should be referred to its arresting inflammatory action of the nervous sheaths. In epilepsy not depending on organic disease, it is given at intervals with purgatives, or in small doses as gtt x, thrice daily, and gradually increased; when worms are the source of these attacks, it removes them, being one of the best vermifuges we have, particularly for tape worm. There are few diseases in which it has not been used, and although never a general favourite, turpentine is a remedy of great power and utility.

Confectio Terebinthinæ, D. *Confection of Turpentine.*

Preparation.—Oil of turpentine fʒj, liquorice powder ℥j; mix, add honey ℥ij, and beat together.

Dose.—ʒj or ij; it is a good way of exhibiting turpentine, and is very miscible with water.

Enema Terebinthinæ, D. L. E. *Turpentine Enema.*

Preparation.—D. Oil of turpentine f℥j, mucilage of barley f℥xvj; mix.

L. E. Oil of turpentine f℥j, yolk of egg, enough to form a mixture with decoction of barley f℥xix. (E. uses plain water instead of decoction of barley.)

The D. form is preferable, as *mucilage* of barley forms a perfect emulsion with the oil; it is used as a stimulating purgative injection in colic, apoplexy, for ascarides, &c.

Linimentum Terebinthinæ, D. L. *Linimentum Terebinthinatum*, E.
Turpentine Liniment.

Preparation.—D. Resin ointment ℥viij, melt, add oil of turpentine f℥v, and mix.

L. Soft soap ℥ij, camphor ℥j, oil of turpentine f℥xvj; shake until mixed.

E. Resinous ointment ℥iv, melt, and add oil of turpentine f℥v, camphor ℥ss; mix.

Used for burns and scalds by Dr. Kentish; they are first bathed in turpentine or spirits of camphor, and then covered with lint dipped in the liniment.

RESINA, D. L. E. *Resin.*

The residue from distilling turpentine; when strongly heated in the process it becomes dark brown and rather empyreumatic, constituting black resin or colophony, when less heated, and containing some water, it is transparent, forming yellow resin; it consists of two acids, pinic and sylvic, both composed of $C_{20}H_{15}O_{2}$, the latter being most soluble in alcohol; by friction, resin becomes electric, and with heat is easily decomposed into a volatile oil and inflammable gas. Medically it is used as an adhesive and slightly stimulating addition to plasters.

Unguentum Resinæ, D. *Ung: Resinosum*, E. *Ceratum Resinæ*, L.
Resin Ointment.

Preparation.—D. Resin in coarse powder ℔ss, yellow wax ℥iv, lard ℔j; melt, strain, and stir until cool.

E. Resin ℥v, axunge ℥viij, bees wax ℥ij; make as D.

L. Bees wax ℔j, resin ℔j, slowly melt, add olive oil f℥xvj, and strain while hot through linen.

A mildly stimulating application to ulcers.

PIX LIQUIDA, D. L. E. *Vegetable Tar.*

Tar is a dark brown, viscid fluid, with a strong peculiar odour, it consists of several oily liquids, resin, oil of turpentine, and acetic acid; by heating, its liquid parts are separated leaving pitch. Tar is obtained from a rude distillation of the trunks and roots of pines in an excavation made in the ground at the side of a hill; the wood is ignited and covered over with sods, so that it may undergo a slow combustion, the resinous matters melt, and being altered by the heat, flow out through a tube, and are collected in barrels; tar is also got in making pyroligneous acid, and as a residue from preparing coal gas, neither of these kinds should be used medicinally; its only use at present is in ointment for some eruptive scalp diseases; tar water was formerly much esteemed, and its vapour employed for phthysis, but they have fallen into disrepute.

Unguentum Picis Liquidæ, D. L. E. *Tar Ointment.*

Preparation.—D. E. Yellow wax ℥iv (℥ij, E.), melt and add tar Oss (℥v, E.) stir until cool.

L. Tar, mutton suet, of each ℔j; melt, and press through a linen cloth.

Applied to some chronic scalp diseases.

Pix Nigra, L. *Pix Arida*, E. *Black Pitch.*

Is the residue of distilling tar; it is a black shining solid, softening when warmed, and consisting of resins altered by heat; pitch has been given in pills for chronic cutaneous eruptions in doses of gr. x to ʒj, and used in the following ointment:—

Unguentum Picis Nigræ, L. *Black Bazilicon.*

Preparation.—Black pitch, wax, resin, of each ℥ix, olive oil f℥xvj; melt, and press through linen.

Uses similar to tar ointment.

JUNIPERUS COMMUNIS, D. L. E. *Juniper.*

A bushy diœcious shrub, leaves evergreen, three in a whorl, linear, longer than the fruit, shining green, glaucous above; flowers axillary, small; males throwing off much yellow pollen; females green, on scaly stalks; fruit a galbulus, consisting of the scales become succulent, and enclosing three hard seeds, it ripens the year after flowering.

It is a native of northern latitudes, growing on hills, particularly where the soil is chalky, and flowers in May; the tops and fruit are directed, but only the latter are used, termed juniper berries; these are the bulk of a pea, coloured blueish black, marked above with three radiating grooves, and beneath by the bracts; they contain a sweetish pulp with rather aromatic turpentine taste and odour, and yield one per cent. of volatile oil, resin, wax, and sugar.

They act as a stimulating diuretic, and are used chiefly in infusion as a vehicle for other remedies of this class; they also are employed in making Hollands, which owe their flavour and diuretic action to the oil of juniper.

Oleum Juniperi, D. L. E. *Oil of Juniper.*—Is got from the fruit and other parts of the plant by distilling with water; it is colourless or pale green, limpid, lighter than water, and soluble with difficulty in spirit of wine; its composition is $C_{10}H_8$. *Dose.*—Gtt ij to vj, in pills or emulsion, as a diuretic.

Spiritus Juniperi Compositus, D. L. E. *Compound Spirit of Juniper.*

Preparation.—D. Juniper berries ℥viij, caraway ℥j, fennel seed ℥j; bruise, and macerate in proof spirit cong. ss, for twenty-four hours, add water Oj, and slowly distil cong. ss.

L. Juniper berries ℥xv, caraway ℥ij, fennel ℥ij; bruise, add proof spirit cong. j, water Oij, and slowly distil cong. j.

E. Juniper berries ℔j, caraways ℥iss, fennel ℥iss; bruise, add proof spirit Ovij, macerate for two days, add water Oij, and distil Ovij.

Used as a substitute for Hollands or gin in stimulating diuretic mixtures. *Dose.*—fʒj to iv.

Infusum Juniperi, D. *Infusion of Juniper.*

Preparation.—The bruised berries ℥j, boiling water Oss; infuse for one hour, and strain off f℥viij. *Dose.*—fʒj to iv.

JUNIPERUS SABINA, D. L. E. *Savin.*

A bushy compact shrub; branches slender, closely surrounded by the small, ovate, imbricated leaves; fruit purple, smaller than the juniper berry.

This plant is cultivated in gardens; it has a heavy peculiar smell when bruised, and a nauseous taste; the dried tops are employed, they are yellowish green, and less odorous than when fresh, their smell depends on essential oil. Savin is seldom given internally, by some it is considered a powerful and certain emmenagogue, and popularly known as a means of causing abortion, but its action is usually dangerous and often fatal; out of four cases in the coroner's return for 1837-8, in three the mother died, and the child perished in the fourth; it causes violent pain, vomiting, stranguary, and in some instances uterine hemorrhage, and on examination after death, the bowels and kidneys are found highly congested.

In ointment it is used to promote the discharge of blisters, and a mixture of verdigris and savin is sometimes applied to soft warts.

Oleum Sabinæ, D. E. *Oil of Savin.*—Is got by distilling the fresh tops with water; it is colourless, and has the odour and taste of the plant; its composition is $C_{10}H_8$. *Dose.*—Gtt ij to vj, in emulsion. This is the best preparation of savin for internal use; or it may be exhibited as an infusion of the tops.

Unguentum Sabinæ, D. *Ceratum Sabinæ*, L. E. *Savin Ointment.*

Preparation.—D. Savin tops dried and in fine powder ʒj, ointment of white wax ʒvij; mix.

L. Wax ℔ss, lard ℔ij, melt, and mix savin bruised ℔j, and strain through linen,

E. As L. boiling the leaves until crisp.

Used to keep up a constant discharge from blisters.

ENDOGENS, *or Monocotyledonous Plants.*

Palmeæ. *Palms.*—Stem strait, leaves large, terminal, pinnate, plaited in vernation; flowers in a spadix with a spathe, hermaphrodite or polygamous; perianth six parted, persistent; pistil with three distinct or united ovaries, two often sterile, ovule erect; fruit a berry or drupe; albumen cartilaginous or fleshy, embryo in a cavity at a distance from the hilum.

Areca Catechu, E. *Areca or Betel Nut Palm.*

Its seeds, which are about the size of a nutmeg, form the celebrated masticatory of the East; boiled in water they afford an astringent extract, like catechu, but it is doubtful whether this is imported into Europe.

Sagus Rumphii, L. *Rumphius Palm.*

Is one of the sources of sago, which is also procured from other monocotyledonous trees, and imported through Singapore; it is obtained by powdering the stem and washing out the farina with water; a single tree often yields 6 cwt. of it; in this state it is sold as meal sago, and is sometimes formed into small pinkish pearly grains, termed pearl sago. Its uses are similar to arrow root, being boiled as a food for invalids.

Zingiberaceæ. *The Ginger Tribe.*—Aromatic tropical herbs; leaves with diverging veins; calyx tubular, three lobed; corolla irregular, six parted, in two rows, stamens three, two abortive; capsule three celled, many seeded, embryo enclosed in a membrane.

ZINGIBER OFFICINALE, D. L. E. *Ginger.*

Biennial, stems annual, erect, four feet high, enclosed in the sheaths of the leaves, which are linear lanceolate, membranous, and smooth; flowers in radical spikes, formed of single flowered, imbricated bracts; corolla, outer lip three parted, inner, one lipped; capsule three celled, many seeded.

This plant is cultivated in Asia and America; commercial ginger is procured from the rhizomes when about a year old, which are scalded in hot water to check vegetation, and dried in the air; if unscraped, they are said to form black ginger; this is mostly brought from the east, it is greyish and horny, or fibrous; white or scraped ginger is in larger pieces, and often covered with a coating of lime; probably they are derived from different plants. Ginger contains an acrid volatile oil, resin, starch, woody fibre, and gum; its chief use is as a flavouring and stimulating addition to other medicines, and as a condiment.

Tinctura Zingiberis, D. L. E. *Tincture of Ginger.*

Preparation.—D. Ginger in coarse powder ℥viij, rectified spirit Oij; macerate for fourteen days, and filter.

L. E. Ginger sliced (in powder, E.) ℥iiss, rectified spirit Oij; macerate for fourteen days, and strain, (prepare as tincture of cinchona, E.)

Dose.—fʒj or ij, added to mixtures. The D. tincture is three times as strong as L. or E.

Syrupus Zingiberis, D. L. E. *Syrup of Ginger.*

Preparation.—D. Tincture of ginger fʒj, simple syrup f℥vij; mix.

L. E. Ginger sliced ℥iiss, boiling water Oj; macerate for four hours, strain, add sugar ℔iiss, and dissolve it. *Dose.*—fʒj to iv.

Curcuma Longa, L. E. *Turmeric.*

Turmeric is cultivated in India and China, for its rhizomes, which are used in Asiatic cookery; in medicine it is employed only as a test for alkalies, which turn paper dipped in a tincture of turmeric to a brown colour.

CARDAMOMUM, D. L. E. *Cardamom.*

A great variety of fruits are termed cardamoms, the plants yielding which are imperfectly known; Pereira has described some of them very fully, especially those called grains of paradise; the true or medicinal cardamom is a native of Malabar.

Eletaria Cardamomum, D. E.—Stems nine feet high, leaves lanceolate, downy, silky underneath; flowering racemes from the base of the stem, branched and horizontal; corolla, outer lip three lobed, inner a single lip; capsule three celled, three valved; seeds many, angular.

The plants spring spontaneously after felling large trees and clearing any brushwood around the spot; in the spring of their fourth year, flowering suckers arise from the stem near their root on which the fruit ripens, and is collected by November, and dried in the sun; it is an ovate, obtusely three-sided capsule, three to eight lines long, and three or four thick, yellowish white, veined longitudinally, and containing numerous brown aromatic seeds; according to their length they are separated into long, short, and medium sizes; when analyzed, they yield about four per cent. of fragrant, colourless, volatile oil, with some fixed oil, colouring, woody fibre, and salts. Their only use is being an agreeable spice.

Tinctura Cardamomi, L. E. *Tincture of Cardamoms.*

Preparation.—L. E. Bruised cardamoms ℥iijss (℥ivss, E.), proof spirit Oij; macerate for fourteen days and filter, (prepare as tincture of capsicum, E.)

An aromatic adjunct to mixtures. *Dose.*—fʒj or ij.

Tinctura Cardamomi Composita, D. L. E. *Compound Tincture of Cardamoms.*

Preparation.—D. Cardamoms ℥ss, caraways ℥ss, cinnamon ℥j, all bruised, cochineal ʒij, proof spirit Oij; macerate for fourteen days, and filter.

L. Cardamoms, caraways, of each bruised, ʒiiss, cochineal in powder ʒj, cinnamon bruised ʒv, raisins stoned ℥v, proof spirit Oij; macerate for fourteen days and strain.

E. As L.; macerate for seven days, or beat the ingredients with some spirit, and after twelve hours percolate.

Dose.—fʒj or ij; its colour and flavour render it more useful than the last tincture.

IRIDEÆ. *Iris Tribe.*—Herbs or under shrubs, with tuberous root stocks; leaves sheathing; perianth petaloid, sometimes irregular; stamens three, from the base of the sepals, anthers opening outwards; stigmas three, often petaloid; capsule three celled, seeds many, albumen horny or densely fleshy.

CROCUS SATIVUS, D. L. E. *Saffron.*

Corm roundish; leaves long, narrow, with a white midrib, appearing as the flowers fade, these arise in autumn; perianth purple, tube long, limb six parted; stamens three; style with three thick drooping orange stigmas, notched at the apex.

Saffron is an Asiatic plant, which has been long cultivated in Europe; the flowers are gathered in the morning, the stigmata and a portion of the style plucked out and carefully dried, while the rest is thrown away; hence it requires about 60,000 flowers to yield ℔j of saffron; it forms reddish brown narrow shreds, an inch or more in length, expanded and notched at one end. Saffron is obtained from the east, and partly from Spain and France; it is not grown in England at present; a variety termed cake saffron used to be made by pressing the stigmata together, which is yet done in Persia, but the little sold of it in these countries consists of safflower and gum water; when analyzed, saffron yielded in 100 parts, 7.5 of volatile acrid oil, 6·5 of gum, 65· of colouring, termed polychroite from the change of colour it undergoes with acids, mixed with wax, lignin, &c.

ADULTERATIONS.—Marygold or safflower petals, and fibres of smoked beef have been found in it; they are detected by infusion in water, and examining the suspected saffron, which should present the characters already described, especially the notched apex.

USES.—Formerly saffron was considered narcotic, sudorific, and emmenagogue, hence it is retained in the pilula aloes et myrrha, and added to diaphoretic mixtures from the idea that it aids the eruption of exanthemata; its chief use is for colouring.

Syrupus Croci, D. L. E. *Syrup of Saffron.*

Preparation.—D. Saffron chopped fine ℥ss, boiling water Oj, infuse for twelve hours, boil them for five minutes, strain with expression through calico, let the sediment subside, and in the clear liquor dissolve twice its weight of refined sugar.

L. E. Saffron ʒx, boiling water Oj, macerate for twelve hours, strain, and add sugar ℔iij.

Dose.—fʒss to fʒij, as colouring for mixtures.

Tinctura Croci, D. E. *Tincture of Saffron.*

Preparation.—Saffron chopped fine ℥ij, proof spirit Oj; macerate for fourteen days, and strain, (proof spirit Oij, prepare like tincture of cinchona, E.)

Dose.—fʒj or ij, for colouring, and used by some as an emmenagogue.

MARANTACEÆ. *Arrow Roots.*—Tropical herbs without aroma, leaves with parallel veins from the midrib; sepals three; petals irregular, of six divisions in two whorls; stamens three, petaloid, two abortive; ovary three celled, seeds hard, embryo naked.

MARANTA ARUNDINACEA, D. L. E. *Arrow Root.*

Root stock white, tuberous, from its root fibres arise scaly tubers which often form new plants, stem three feet high, branched; leaves alternate, with long hairy sheaths, panicles terminal, loose; calyx green; corolla white, small; ovary three celled, fruit dry, one seeded.

It is cultivated in the West Indies; the arrow root is got by digging up the scaly tubers when one year old, beating them into pulp, and washing out the starch with water, which subsides to the bottom of the vessel, and after washing is dried in the sun; it is sold in fine white powder, or easily pulverized masses, without taste or odour, consisting of numerous starch granules, varying from ·750 to ·2,000 of an inch in length, having at one end a small circular hilum, and surrounded by finely marked rings; its composition is

$C_6H_5O_5$. Dr. Prout considered it a low form of starch, bearing a similar relation to wheat starch, that sugar of honey does to cane sugar. Boiled in water or milk, and sweetened, it is used for the diet of invalids and infants; it has the properties of starch, and its nutritive value must therefore be slight; a table spoonful forms a stiff jelly with water Oj.

ADULTERATIONS.—Potato starch is sometimes mixed with it, its grains are irregular, larger, and easily detected by the eye or under a microscope.

SMILACEÆ. *Smilaxes.*—Climbers, stems woody, flowers diœcious, perianth six parted; stamens six; ovary three celled, stigmas three, fruit a roundish berry, albumen cartilaginous.

SARSAPARILLA, D. L. E.

This drug is got from several imperfectly known plants; D. and L. consider its source to be the *S: officinalis* of New Grenada, which is collected and sent to Jamaica; and E. states, it is "probably got from other species," as the *S: medica*, growing on the Mexican Andes, which constitutes Vera Cruz sarsaparilla, and *S: syphilitica* the source of that from Brazil. It is brought from Jamaica in bundles twelve to eighteen inches long, and four or five broad, consisting of long slender runners with numerous rootlets, from these and the colour of its cortex it is termed red bearded sarsaparilla; it tastes slightly bitter, and has less starch and more extract than the inferior varieties. Brazil or Lisbon sarsaparilla is in loose bundles three to five feet long, it has more starch, fewer rootlets, and less extract than that from Jamaica, and is less marked by longitudinal wrinkles. The description brought from Lima resembles the Jamaica variety, it is sold in large bundles with the rhizome packed inside. An inferior kind with greyish brown cortex, and containing much starch is imported from Honduras. Other roots are said to be substituted for sarsaparilla occasionally; the commonest fraud is using inferior for fine varieties. It contains a little volatile oil, acrid resin, and a substance termed parillin or smilacin, its properties are not very evident, the frothing of the decoction when shaken is ascribed to it.

USES.—Many consider sarsaparilla useless, others have much confidence in it, and prescribe its preparations alone or with other alteratives, as iodide of potassium, in secondary venereal and cutaneous diseases and scrofula; perhaps its effects would be more decided if it were given warm, and diaphoresis promoted at the same time, which we know aids the operation of antimonial alteratives.

Decoctum Sarsaparillæ, D. *Decoctum Sarzæ,* L. E.
Decoction of Sarsaparilla.

Preparation.—D. Sarsaparilla sliced ℥ij, boiling water Oiss, digest for one hour, boil for ten minutes, cool, and strain off about Oj.

L. E. Sarza ℥v, boiling water Oiv, macerate for four hours near the fire, (two hours at a heat below boiling, E.,) remove and bruise the root, replace and macerate it for two hours more, boil down to Oij, and strain.

Dose.—f℥iv to viij, thrice daily.

Decoctum Sarsaparillæ, (*Sarzæ,* L. E.) *Compositum,* D.
Decoction of Sweet Woods.

Preparation.—D. Sarsaparilla sliced ℥ij, sassafras chips, guaiacum turnings, bruised liquorice, of each ʒij, mezereon ʒj, boiling water Oiss, digest for one hour, then boil for ten minutes, and strain off little more than Oj.

L. E. Boiling decoction of sarza Oiv, bruised sassafras, guaiacum shavings, bruised liquorice, of each ʒx, mezereon ʒiij, (℥ss E.,) boil for a quarter of an hour and strain.

Dose.—f℥iv to viij thrice daily.

Syrupus Sarzæ, L. E. *Syrup of Sarsaparilla.*

Preparation.—Sarza sliced ℥xv, boiling water cong. j, macerate for twenty-four hours, boil down to Oiv, strain, add sugar ℥xv, and evaporate to a proper consistence.

Dose.—fʒj to iv, as a flavouring adjunct; it may be made from extract of sarsaparilla and syrup.

Extractum Sarsaparillæ, (*Sarzæ,* E.) *Fluidum,* D. *Extractum Sarzæ,* L.
Extract of Sarsaparilla.

Preparation.—D. Sarsaparilla ℔j, boiling water Ov, digest for two hours, at a temperature near 212°, decant, and digest again with boiling water Oiij, for two hours, decant, and evaporate the mixed liquids, by steam or water heat, to the consistence of a thin syrup, and when cool, add rectified spirit to make entirely f℥xx.

E. Sarza ℔j, boiling water Oiv, digest for two hours, bruise the sarza, replace and boil for two hours, filter and squeeze this; boil the residue in water Oij, filter and squeeze this also, mix and evaporate all to the consistence of thin syrup, when cool add rectified spirit to make f℥xvj, and filter. It may be aromatized with volatile oils, or warm aromatics.

L. Sarza ℔iiss, boiling water cong. ij, macerate for twenty-four hours, boil down to cong. j, strain while hot, and evaporate to an extract.

Dose—of L. ʒss. to ʒj, of D. and E. ʒj to iv, diluted with water.

LILIACEÆ. *Lilies.*—Root fibrous or fasciculate; stem none, a bulb, tuber, or arborescent; perianth inferior, regular, coloured; stamens six, anthers opening inwards; ovary and fruit three-celled, stigma simple or three-lobed.

URGINEA SCILLA, D. *The Squill.*

Bulb large, half above ground; leaves lanceolate, appearing after the flower; scape three feet high, with a dense raceme and long bracts; flowers yellowish green; stamens six, anthers yellow; capsule three-celled, seeds many, in two rows. By L. and E. it is termed the *Squilla Maratima.*

The squill grows on the shores of the Mediterranean, and flowers in August; its bulb is used medically, it varies from the size of an apple to a child's head, and consists of scales like an onion, the outer of which are dry, the inner fleshy and full of acrid juice; there are two varieties described, those with red and white outer scales; the bulbs should be kept in dry sand, or sliced and dried with care, which is usually done abroad; its pieces are then brittle and easy to powder, but rapidly attract moisture, it tastes acrid and nauseous, and contains nine or ten per cent. of raphides or small crystals, with a peculiar bitter, crystalline substance, termed scillitine, and an acrid principle.

USES.—Full doses, as gr. x cause vomiting, its action is uncertain, often violent, and objectionable from its liabilty to irritate the stomach; small doses, as gr. j to iij, are diuretic, and employed in dropsies, particularly anasarca from disease of the heart, for which foxglove may be given with it; in chronic bronchial attacks squill is prescribed as an expectorant, in repeated small doses, as gr. ss to gr. j, with which other remedies of this class are usually combined. Gr. v of the powder are equal to ʒss of the fresh bulb.

Pilulæ Scillæ Compositæ, D. L. *Pilulæ Scillæ,* E. *Squill Pill.*

Preparation.—D. Powder squill ʒiiss, ginger in powder, ammoniac in powder, soap, of each, ʒij, mix, add treacle ℥ss, by weight, and beat into a mass.

E. As D., using conserve of roses ʒj, instead of treacle; divide into gr. v pills.

L. Squill ʒj, ginger ʒij, ammoniac ʒij, soap ʒiij, syrup to form the mass.

Dose.—Gr. v to xx, as an expectorant or diuretic.

Tinctura Scillæ, D. L. E. *Tincture of Squill.*

Preparation.—Squill in coarse powder ℥v, proof spirit Oij, macerate for fourteen days, and strain. (Prepare like tincture of cinchona, without packing it in the percolator, E.)

Dose.—Gtt x to xxx, diuretic or expectorant in mixtures.

Acetum Scillæ, D. L. E. *Vinegar of Squill.*

Preparation.—D. Squill dried and bruised ℥ij, commercial acetic acid, dens. 1044, f℥iv, water ℥xij, macerate for 7 days, strain, press, and filter.

L. Squill dried ℥xv, distilled vinegar Ovj, macerate with gentle heat in a closed vessel for twenty-four hours, press, let the dregs subside, and add proof spirit Oss, to the clear liquor.

E. As L., macerate for seven days, press, and add proof spirit f℥iij, to the clear liquor.

Used like the tincture, and to prepare—

Syrupus Scillæ, D. E. *Oxymel Scillæ*, L. *Syrup of Squills.*

Preparation.—D. E. Vinegar of squill f℥viij, (Oiij, E.,) pure sugar ℔j, (℔vij, E.,) dissolve with gentle heat.

L. Vinegar of squill Oiss, despumated honey ℔iij, boil to a proper consistence.

An expectorant in doses of fʒj, or repeated every quarter of an hour, as an emetic for children.

ALOES, D. L. E.

Juicy plants; flowers spiked, perianth tubular, six-cleft, imbricated fleshy; stamens hypogynous, longer than the perianth; capsule membranous.

Aloes are the inspissated juice of several species of aloe; it is contained in vessels running beneath their epiderm, the inner part having a watery sap; common varieties are got by boiling the leaves in water and evaporating to an extract, finer kinds exude spontaneously from the cut leaves. *Cape aloes* are imported in chests and skins from the Cape of Good Hope, it resembles black resin, being usually of deep shining black colour, with an olive tinge, and in thin layers, ruby red; it is brittle, strong-smelling, and disagreeable; in powder it has a greenish yellow colour; this kind is got from various aloes indiscriminately. *Barbadoes aloes* are sold in gourds, its hue varies from black to brown, its fracture is rather dull, its odour unpleasant, and it is tough and difficult to pulverize; its chief source is the *A: Vulgaris*, which has a shrubby stem, sword-shaped leaves, with hard reddish spines, and yellow flowers. *Socotrine aloes* are brought, at least in part, from the Island of Socotra, packed in skins and then in casks; the best pieces are garnet-coloured, darkening on exposure to air, it breaks in general smoothly, and its thin fragments are of fine red hue; its odour is fragrant, particularly if heated, and its powder is golden yellow; when imported, after picking out the finer lumps, the rest is melted and strained to render it saleable; it is derived from the *A: Socotrina*, which has a thick woody stem, and ensiform leaves with small serrations, its flowers are scarlet, and green at the point. *Hepatic aloes* are probably derived from similar localities to the last, which it resembles in odour, but is less agreeable, its colour varies from yellowish to dark brown, it is opaque, and its powder is a reddish yellow.

Composition.—Aloes have a persistent bitter taste; the aloesin, or bitter part, dissolves in cold water, its amount varies from 50 to 80 parts in 100; the more insoluble portion, termed resin, which is probably oxidized extractive, varies from 6 to 42 per cent.; aloes also contain aloetic acid, and albumen, which abounds in the inferior varieties.

EFFECTS.—Small doses act as a tonic, larger ones are purgative, it operates slowly, and especially on the great intestine, and has been charged with causing piles, disease of the rectum, menorrhagia, and emaciation, these are doubtless exaggerations, but it is not adapted for inflammatory diseases, where affections of the pelvic viscera exist, or where rapid purgation is required; it is considered to promote hepatic secretion, or supply its place, and used for habitual costiveness, for dyspepsia, to excite menstruation in atonic conditions of the uterus, and enters into most of the purgative pill masses; in enema it may be employed for ascarides.

DOSE.—Gr. v to x as a purgative; gr. ss for its tonic effects.

Pilula Aloes Composita, D. L. *Pilula Aloes*, E. *Aloetic Pill*.

Preparation.—D. L. Aloes in powder ℥ij, extract of gentian ℥j, oil of caraway fʒj, treacle by weight ℥j, mix. (L. uses oil of caraway 80 minims, and syrup instead of treacle.)

E. Socotrine aloes, Castile soap, equal parts, beat into a mass with conserve of roses. It may be made with the finer East Indian aloes, and many, with reason, prefer the stronger Barbadoes aloe. *Dose.*—Gr. v to x.

Pilula Aloes et Assafœtidæ, E. *Aloes and Assafœtida Pill.*

Preparation.—Socotrine or East Indian aloes, assafœtida, Castile soap, of each equal parts, mix into a mass with conserve of roses.

Dose.—Gr. x to xv.

Pilula Aloes et Ferri, E. *Aloe and Iron Pill.*

Preparation.—Sulphate of iron three parts, Barbadoes aloes two parts, powder, add aromatic powder six parts, conserve of roses eight parts, mix, and divide into gr. v. pills. *Dose.*—One to three, in chlorosis.

Pilula Aloes cum Myrrha, D. L. E. *Aloe and Myrrh Pill.*

Preparation.—D. Aloes ℥ij, myrrh ℥j, dried saffron ℥ss, all powdered, mix, and sift, add treacle ℥iiss, by weight, and mix.

L. as D., using saffron ℥j, and syrup instead of treacle.

E. Socotrine of East Indian aloes four parts, saffron one part, myrrh two parts, conserve of roses enough to form a pill mass.

Dose.—Gr. x to xv. It is usually termed Rufus' pill.

Pulvis Aloes Composita, L. *Compound Aloetic Powder.*

Preparation.—Aloes ℥iss, guaiac resin ℥j, powder, and add compound powder of cinnamon ℥ss, mix. *Dose.*—Gr. x. to xx, seldom used.

Extractum Aloes Aquosum, D. *Ext: Aloes Purificatum*, L.
Extract of Aloes.

Preparation.—D. Coarse powdered hepatic aloes ℥iv, boil it with water Oij, until dissolved; when it becomes cold, and the dregs have subsided, pour off the clear fluid and evaporate it.

L. Aloes powdered ℥xv, boiling water cong. j, macerate for three days, with gentle heat, strain, and proceed as D.

A useless form; it is intended to remove the insoluble extractive.

Dose.—The same as aloes.

Vinum Aloes, L. E. *Wine of Aloes.*

Preparation.—L. Aloes ℥ij, canella ʒiv, powder, add sherry Oij, macerate for fourteen days, and strain.

E. Socotrine, or East Indan aloes ℥iss, cardamons ground ʒiss, ginger in coarse powder ʒiss, sherry Oij, digest for seven days, and strain.

A warm cathartic, seldom used. *Dose.*—f℥ss to f℥j.

Tinctura Aloes, L. E. *Tincture of Aloes.*

Preparation.—L. Aloes in coarse powder ℥j, extract of liquorice ℥iij, water Oiss, rectified spirit Oss, digest fourteen days, and strain.

E. As L. using spirit f℥xij, and macerate for seven days.

Dose.—fʒj to iv, as a purgative, added to draughts.

Tinctura Aloes Composita, L. *Tinctura Aloes cum Myrrha*, E.
Compound Tincture of Aloes.

Preparation.—Aloes in powder ℥iv, saffron ℥ij, tincture of myrrh Oij, macrate for fourteen days, (seven days, E.,) and strain.

Dose.—fʒj or ij, in mixtures.

Decoctum Aloes Compositum, D. L. *Decoctum Aloes*, E.
Compound Decoction of Aloes.

Preparation.—D. Hepatic aloes powdered ʒiss, myrrh in powder ʒj, pure carbonate of potash ℈ij, rub together, add water f℥xiv, saffron chopped fine ʒj, extract of liquorice ℥ss, boil for ten minutes in a covered vessel; cool, strain through flannel, and add compound tincture of cardamoms to make f℥xvj.

E. as D., using water f℥xvj, boil to f℥xij, strain, and add tincture of cardamoms f℥iv.

L. Extract of liquorice ʒvij, carbonate of potash ʒj, aloes, myrrh, saffron, of each ʒjss, water Oiss, boil to Oj, strain, and add compound tincture of cardamoms f℥vij.

A mild tonic aperient. *Dose.*—f℥ss to f℥ij.

Allium Sativum, L. E. *Garlic.*

Is never used in regular medicine, although formerly much esteemed; it should be removed from the materia medica.

Melanthaceæ. *Colchicum Tribe.*—Roots fibrous or fascicled, rhizome sometimes a corm, leaves sheathing; perianth tubular, or in six pieces; stamens six, anthers opening outwards, ovary three-celled, seeds many; style three-parted, capsule divisible into three; albumen dense.

COLCHICUM AUTUMNALE, D. L. E. *Meadow Saffron.*

Root fibrous, from a fleshy corm, the size of a chesnut, covered by brown integuments and furrowed on one side; in June the corm is largest and in perfection, and a new small one is seen at its base, close to the root fibres, this flowers in autumn, and enlarges by next spring, when the young seed vessel rises from it, with leaves, having remained under ground from the previous autumn; the seeds ripen about midsummer. The old corm becomes spongy as the new flower rises, but retains its form until May, in its second year, when it is shrivelled and attached to the lower end of the new corm. In Scotland the seeds do not ripen, the plant propagating by throwing off small corms in its second spring.

The leaves are broadly lanceolate; flowers many, from a spathe; perianth with a long white tube and six parted pale purple limb; capsule three celled, united at their base; seeds rough, brown, and roundish.

It grows in moist meadows over Europe, and is thought most active in July, when the leaves have faded, and before the new corm appears, but is often collected later; the cormus resembles a tulip bulb, being solid however, and not consisting of scales; internally it is white and has a milky juice; it is preserved by being cut into transverse slices, and dried in dark airy places, at a heat not exceeding 178°; the pieces should be firm and oval, with only one notch not fiddle-shaped, greyish white, and odourless; the seeds are the size of mustard, without smell, and having a bitter, acrid taste; they are tough and difficult to powder. Pelletier states that colchicum contains the alkaloid veratrine, with gallic acid, colouring, fat, gum, &c.; Geiger asserts it has a new substance, termed colchicine, distinguished from veratrine by dissolving in water, and not causing sneezing.

Effects.—In large doses it causes vomiting, abdominal pain, purging, and often cramps, but narcotic symptoms do not appear to be usual; in medicine it is chiefly employed for gout; some consider it specific, others only a palliative, acting by its cathartic and sedative effects in relieving the symptoms, while some accuse it of rendering the attacks more frequent, and confirming the gouty disposition; it has no doubt greater power than any other drug of checking this disease, and perhaps excesses during the comparative health following its use, have more to do with its quick return than the colchicum; besides, in the gouty there seems to be at intervals, an accumulation of some kind which is discharged by the attack, and it is very possible that, though colchicum may for the time relieve, it does not remove it, or prevent a recurrence. It may be given in small doses at intervals, so as to cause little evident effects; or more freely to produce decided evacuations by purging, vomiting, or diaphoresis. In acute rheumatism it is often of little use, unless the attacks approach to gouty, and sometimes it does good in the decline of the disease, where it was unsuccessful sooner; Sir B. Brodie prefers it when several joints are affected, and where the synovial sheaths of the tendons and bursæ mucosæ are affected; for sciatica, and neuralgia, it is often of use along with mercury; and in lithic acid deposits connected with gout, it is beneficial in moderate doses; it has also been employed in inflammatory diseases as an antiphlogistic, and in dropsies, as a cathartic and diuretic.

DOSE.—Gr. ij to vj, in powder, thrice daily.

Tinctura Seminum Colchici, D. L. E. *Tincture of Colchicum Seeds.*

Preparation.—The bruised seeds ℥v, proof spirit Oij, macerate for fourteen days, and strain. (E. uses ground colchicum, digests for seven days, or prefers percolation.) *Dose.*—Gtt xv to fʒj.

Vinum Colchici, L. E. *Colchicum Wine.*

Preparation.—The dry sliced corms ℥viij, sherry Oij, digest for fourteen days, and strain, (seven days, and strongly express the residue. E.)

Dose.—Gtt xv to fʒj.

Acetum Colchici, D. L. E. *Vinegar of Colchicum.*

Preparation.—D. The dry bruised corms ℥j, commercial acetic acid, dens. 1·044, f℥iv, distilled water f℥xij, macerate for seven days, strain, press, and filter.

L. E. The fresh corm sliced ℥j, distilled vinegar f℥xvj, digest in a glass vessel for three days; press, strain, and when the dregs subside, add proof spirit f℥j to the clear liquid.

The D. form is three times stronger than L. or E..

Dose.—Gtt xv to fʒj.

Extractum Cormi Colchici, L. *Extract of Colchicum.*

Preparation.—Bruise the fresh corm ℔j, sprinkled with a little water, express the juice, and evaporate to an extract.

Dose.—Gr. j, or ij, seldom used.

Extractum Colchici Aceticum, D. L. E. *Acetous Extract of Colchicum.*

Preparation.—D. The dried corm ℥iv, dilute acetic acid f℥viij, digest for fourteen days, filter, and evaporate by a water bath to a soft extract.

L. The fresh corms ℔j, acetic acid f℥iij, gradually sprinkle, express the juice, and evaporate in an earthen vessel, not glazed with lead.

E. as L., using pyroligneous acid, and evaporate over a vapour bath.

Dose.—Gr. j to iij, frequently combined with mercurials, purgatives, &c.

VERATRUM ALBUM, L. E. *White Hellebore.*

Root of fleshy fibres from a perennial root-stock, stem four feet high, leaves elliptic, plaited; racemes terminal, flowers polygamous, perianth six-parted, segments broad; capsules united below, dividing into follicles.

The rhizome is brought from Germany, with the root fibres; it is two or three inches long, and about one in diameter, having a slight smell, and an acrid taste; it contains an alkaloid veratrine, combined with gallic acid. White hellebore causes sneezing when applied to the nose; it is used externally in some chronic eruptive diseases, and to destroy pediculi; in this country it is not employed internally, although recommended as a substitute for colchicum; its dose is gr. ss to gr. ij, it is emetic in doses of gr. x, and ℈j has proved fatal in three hours.

Vinum Veratri, L. *Wine of White Hellebore.*

Preparation.—Sliced hellebore ℥viij, sherry Oij, macerate for fourteen days, and strain. *Dose.*—Gtt x, twice or thrice, daily.

Decoctum Veratri, L. *Decoction of White Hellebore.*

Preparation.—Bruised hellebore ʒx, water Oij, boil to Oj, when cool add rectified spirit f℥iij, and strain.

Employed as a lotion for skin diseases, and to destroy pediculi.

Unguentum Veratri, L. *Ointment of White Hellebore.*

Preparation.—Powdered hellebore ℥ij, lard ℥viij, oil of lemon 20 minims, mix.

Used for scabies instead of sulphur ointment.

Sabadilla, L. E.

Cevadilla are the mixed fruits, stalks, and abortive flowers of the *Asagræa officinalis*, a native of the Mexican Andes, (and probably of other *Me-*

lanthaceæ, E.) The capsules are thin, dry, pale yellowish brown, about half an inch long, and a line and a half in diameter, three of them adhere at their base to form the fruit; they usually are empty, or contain one or two brown seeds, without odour, but having an acrid bitter taste, and are employed as a source of veratrine, ʒj of which is obtained from ℔j of cevadilla. They are not used internally in this country; a strong tincture may be employed locally as a rubefacient.

Veratria, L. E. *Veratrine, or Sabadilline.*

L. Boil cevadilla bruised ℔ij, thrice, with spirit, (as in preparing strychnine,) distil the spirit from the strained liquids, and evaporate the residue to an extract; boil this three or more times in water, with some sulphuric acid, and gently evaporate the strained fluid to the thickness of syrup; when cold, saturate with magnesia, press and wash the precipitate two or three times, dry it, and digest with gentle heat, twice or thrice in spirit, and as often strain; distil off the spirit, boil the residue in water, with some sulphuric acid and animal charcoal, strain, washing the charcoal, evaporate to the thickness of syrup, precipitate the veratria by ammonia, and dry it.

E. Macerate cevadilla, with boiling water, for twenty-four hours, then squeeze it dry, beat it in a mortar, and separate the seeds from the capsules by brisk agitation, in a deep narrow vessel; grind the seeds in a coffee mill, form them into a paste with rectified spirit, and percolate it as long as the spirit passes through coloured; concentrate the spirit by distilling, so long as no deposit forms, and pour the residue, while hot, into twelve times its bulk of cold water, filter through calico, and wash the residue on the filter as long as ammonia precipitates the washings; mix these and the filtered liquid, add ammonia, collect the deposit, slightly wash it with cold water, and dry it with filtering paper, and then with the vapour bath. More may be got from the filtered liquid by concentrating and cooling it.

Veratria is a greyish, odourless powder, usually tasting acrid and bitter, and causes violent sneezing; when pure it is white, acrid, not bitter, and looks like a resin; though uncrystalline, it saturates acids; one part of it dissolves in 1000 of boiling water, and it readily melts in alcohol; its composition is $C_{34}H_{22}O_6N$. Externally it is employed in ointment with 16 parts of lard, for neuralgia; it causes heat and tingling, but is inferior to aconitine; internally it has been used in doses of the twelfth of a grain, for gout and rheumatism.

ACORACEÆ. *Sweet Flags.*—Rhizome jointed, leaves ensiform; spadix leaf-like; anthers two-celled, turned inwards; ovaries three-celled, each with about six pendulous ovules; fruit finally juiceless, seeds albuminous.

Acorus Calamus, L. E. *Sweet Flag.*

Rhizome rather spongy, aromatic; leaves three feet high; stalk thicker below the spadix, which issues from one side of it, about a foot above the root, is three inches long, and thickly set with pale green flowers.

It is plentiful in Norfolk, where it is collected; the dry rhizome forms flattened pieces, a few inches long, and half an inch wide, marked above by transverse grooves where the leaves sprung, and below by the traces of roots, like dark points surrounded by white rings; they are brownish outside, and pale pink within. Sweet flag is seldom used; it is an aromatic and mild bitter, and may be given in powder or infusion, like gentian.

GRAMINACEÆ. *Grasses.*—Stem round, usually fistular; leaves alternate, sheaths split; flowers in small spikes, consisting of imbricated bracts, the outer termed *glumes*, those round the stamens *paleæ*, and the inner, at base of ovary, *scales*, which may be two, three, or absent; stamens hypogynous, anthers versatile; ovary simple, stigmas feathery; pericarp membranous, embryo on one side, lenticular.

Avena Sativa, D. L. E. *The Oat.*

Oats consist, in 100 parts, of meal 66, and bran 34; the meal is composed of starch, bitter matter, sugar, fixed oil, gum, and albumen; it is employed in diet, and medically, as a stupe for some skin diseases, as eczema and herpes, by boiling it with water.

Hordeum Distichon, D. L. E. *Common Barley.*

Spikelets three together; glumes two, ending in long awns; with one perfect flower, which is distichous, awned; lateral florets male, awnless; paleæ two, the lower awned; stamens three; ovary hairy at the apex, grain oblong, furrowed longitudinally, adherent to the paleæ.

Scotch barley is obtained by removing the husks; pearl barley, by rounding the grains in a mill; and patent barley by grinding them; 100 parts of the meal contains starch 67, gum 4·6, sugar 5, gluten 3·5, albumen 1, with salts, water, and lignin; barley is used in—

Decoctum Hordei, D. L. *Barley Water.*

Preparation.—D. Pearl barley ℥iss, wash with cold water, reject the washings, and boil with water Oiss, for twenty minutes, and strain.

L. Barley ℥iijss, wash, then boil with water Oss, reject this, pour hot water Oiv on the barley; boil down to Oij, and strain.

Used as a mild drink, and as a vehicle for gargles, &c.

Decoctum Hordei Compositum, L. *Mistura Hordei*, E.
Compound Decoction of Barley.

Preparation.—L. Decoction of barley Oij, figs sliced ℥iiss, liquorice root bruised ʒv, raisins ℥ijss, water Oj; boil down to Oij, and strain. (E. Pearl barley ℥iiss, wash this clean and boil with water Oivss, down to Oij, add the rest as L., and strain.)

Used like the decoction; they take too long in preparing.

Mucilago Hordei, D. *Mucilage of Barley.*

Preparation.—Ground pearl barley ℥ss, water f℥xvj, gradually mix and boil for a few minutes.

This new preparation is the best mode of using barley, it enters into the turpentine enema, and the—

Enema Catharticum, D. *Cathartic Enema.*

Preparation.—Mucilage of barley f℥xvj, sulphate of magnesia ℥j, dissolve, add olive oil f℥j, and mix.

ERGOTA, D. L. E. *Ergot of Rye.*

Is found on rye in low damp fields during warm summers; its effects were long popularly known in France, though not employed medically until the end of the last century, and in these countries in 1824. Various opinions are entertained of its nature, some considering it a fungus, but Mr. Queckett has shewn that ergot is the altered grain, being articulated to the receptacle, and often having the remains of a stigma; he has described the young grain becoming covered with the sporidia of a fungus, and filaments like mildew, a sweet juice is next found in the flower, when half grown the grain is dark purple, its upper part being vermiform and undulated, the formation of sporidia nearly ceases, and the grain then rapidly elongates. Mature ergot is violet black, an inch or more in length, curved, unequally furrowed, roundish, and brittle when dry, internally it is pale pink; its taste is disagreeable and rather acrid, and, when in quantity, it has a nauseous odour. Many grasses are liable to a similar disease. Analyzed by Dr. Wright, it gave thick white oil 31·, osmazome 5·5, mucilage, gluten, and colouring 19·, fungin 11·, fecula, salts, &c., 29·1, in 100 parts. Bonjean states that its active principles are a yellow acrid oil, and an aqueous extract having decided anti-hemorrhagic effects.

ADULTERATIONS.—Are rare; it is liable to be attacked by a small mite, which destroys its interior, producing much powdery matter, said to be excrementitious; this is best obviated by keeping it with camphor in glass bottles. Ergot should not be used when gathered beyond two years.

EFFECTS.—Some epidemic diseases are attributed to using ergot for food; it is stated to cause voracious appetite, and a feeling of creeping over the skin, terminating either in convulsions, or causing cold extremities and dry gangrene. In single doses of ʒss to ʒij, it may produce nausea, head-ache, and in some persons stupor or delirium. Medically it is used to promote, or increase uterine action; to cause abortion; to stimulate the uterus in protracted labors when the presentation is natural, and the parts dilated, or dilatable; to expel the retained placenta in atony of the womb, or clots, polypi, &c., and to check uterine hemorrhage, whether puerperal or not. It should not be employed when the os uteri is rigid, or any deformity or malpresentation exists, which acts as a mechanical obstacle to labor; and many think that it endangers the child's life from exerting a poisonous effect on the heart of both mother and infant, shewn by the diminution of their pulsations, or from the increased contractions of the uterus interfering with the placental circulation. Ergot has also been used in leucorrhœa, hemorrhages generally, and amenorrhœa.

DOSE.—Gr. xv to xx of the powder repeated every twenty minutes during labour, for three doses if necessary; Dr. Rigby combines borax gr. x, and cinnamon water f℥j with each dose. For other cases gr. v to x of ergot may be given thrice daily.

Infusum Ergotæ, D. *Infusion of Ergot.*

Preparation.—Ergot in coarse powder ʒij, boiling water f℥ix; infuse for one hour, and strain off f℥viij. *Dose.*—f℥j to f℥iss.

Tinctura Ergotæ, D. *Tincture of Ergot.*

Preparation.—Ergot in coarse powder ℥viij, proof spirit Oij; macerate for fourteen days, and filter, *Dose.*—fʒss to fʒj.

Oil of Ergot.—Obtained by evaporating an etherial tincture of ergot. It is colourless when made from fresh ergot, but often tinged brownish, is slightly acrid, soluble in alcohol, and lighter than water. *Dose.*—Thirty to fifty drops; its effects are stated to resemble ergot.

TRITICUM, D. L. E. *Wheat.*

Spike four cornered, imbricated; spikelets usually four flowered, flowers distichous, glumes two, equal; stamens three; grain loose, convex outside, deeply furrowed within.

The composition of wheat flour varies, it contains fifty-six to seventy per cent. of starch, seven to fourteen of gluten, four to eight of sugar, with different amounts of gum and water. Gluten is obtained by washing out the starch from flour with cold water, it is a greyish viscid mass, rich in nitrogen, and hence most nutritious, approaching in its nature to albumen and fibrin; it is used as an antidote for corrosive sublimate or sulphate of copper, and made into bread with one-fifth of its weight of starch, it is recommended in diabetes, to avoid the quantity of starch in ordinary bread, which is injurious from its rapid conversion into sugar during digestion.

Starch is got by steeping flour in water for a week or two, its sugar and gum dissolve, forming an acid solution which melts out the gluten, the starch is then washed, and splits while drying into irregular prisms. It consists of granules, which are mostly globular, marked by rings around a central spot, the hilum; they are composed of an envelope termed amylin, insoluble in cold water, and containing the starch or amidine; its composition is probably $C_{12}H_{10}O_{10}$; by germination, fermenting, or boiling with dilute sulphuric acid, it forms grape sugar; nitric acid converts it into oxalic acid, and iodine gives a deep blue with its cold solution, which disappears on heating it.

Mucilago Amyli, D. E. *Decoctum Amyli*, L. *Mucilage of Starch.*

Preparation.—D. Starch ℥iv, water Oss (Oj, L. E.); mix, and boil for a few minutes.

Used in the enema opii.

SACCHARUM OFFICINARUM, D. L. E. *Sugar Cane.*

Stem solid, jointed, hard externally, six to twelve feet high, leaves long, sheathing; panicles long, silvery from long soft hair round each flower, spikelets fertile, in pairs, one sessile and one stalked; the lower neuter with one palea, the upper perfect with two paleæ, stamens three.

Sugar abounds in many plants; it is procured from the sugar cane by pressing it, saturating its acids with lime, and evaporating the juice; the liquid molasses are then drained off and brown sugar remains; this is purified by dissolving it in water, fining with albumen, filtering through animal charcoal, evaporating and crystallizing in moulds to form white sugar, or more slowly to obtain sugar candy. Pure sugar consists of $C_{12}H_9O_9+2Aq$; dens. 1·6; it dissolves in two parts of cold water, or eighty of alcohol, and when heated, is decomposed into a dark brown substance termed caramel.

Syrupus Simplex, D. E. *Syrupus*, L. *Syrup.*

Preparation.—Refined sugar in powder ℔v, water Oij (Oiss, L. E.); dissolve with steam or water heat. (Dens. 1·330, D.) Used for flavouring.

CRYPTOGAMIA, *or Acotyledonous Plants.*

FILICES. *Ferns.*—Leafy plants with a rhizome, leaves coiled up before expanding, usually much divided, veined; reproductive organs arise from the veins on the under side of the leaf, they are small capsules or sporangiæ.

Nephropium (Aspidium, L.) Filix Mas, E. *Male Fern.*

Rhizome large, horizontal, with many tufts springing from it in circles, one to four feet high; fronds bipinnate; pinnæ obtusely serrate; sori roundish, in two rows near the central vein.

Male fern is found in woods; its under ground stem should be collected in autumn, the sound part dried, powdered, and kept in bottles; usually the thickened foot stalks, with a little adhering rhizome, is sold for it; its odour is disagreeable, and its taste nauseous. It is used as a remedy for tape worms, taken in doses of ʒj to iij, fasting, and followed after two hours by a strong purgative; its effects depend on an oil which may be obtained by evaporating the etherial tincture of fern; it is thick and blackish. *Dose.*—fʒss to f℥j, in emulsion.

LICHENES. *Lichens.*—Perennial plants with a leafy expansion or thallus; reproduced either by sporules lying in membranous tubes which burst through the cortex, and form hard disks or apothecia, or from separated cells of the medulla.

CETRARIA ISLANDICA, D. L. E. *Iceland Moss.*

Two or four inches high, composed of a dry, smooth, irregularly divided thallus; its apothecia are like small cups with an elevated rim, brown, and near the border of the thallus.

It is imported through Hamburgh, probably from Norway, and is common on mountains over the world; its colour is greyish; it is odourless, and tastes bitter from containing a substance termed cetrarin; cold water dissolves about sixty-five per cent. of it, forming a bitter jelly when cool; maceration with a weak solution of carbonate of potash will remove its bitterness, after which it forms only a mild article of food; if the bitter is retained, it acts as a mild tonic, and has been used in chronic pulmonary affections.

Decoctum Lichenis Islandici, D. *Decoctum Cetrariæ,* L. *Decoction of Iceland Moss.*

Preparation.—D. The moss ℥j, wash it in cold water, and then boil with water Oiss for ten minutes, and strain off Oj while hot.

L. Iceland moss ʒv, water Oiss; boil down to Oj, and strain.

Dose.—f℥j to iv, thrice daily.

Lacmus. Litmus.

Is brought from Holland; its source and manufacture are not fully known; L. and E. ascribe it to the *Rocella tinctoria* of the Canaries, but the Lecanora tartarea of Sweden is stated to be its true origin; it forms small blue cakes containing chalk, and is used on paper as a test for acids, which render it red; it also shows the presence of alkalies, they restore the colour of litmus paper that has been reddened previously with vinegar.

ALGÆ. *Sea Weeds.*—Leafless plants, composed of vesicles, articulated filaments, or lobed fronds; reproductive matter wanting, or in the joints of the filaments, or thecæ.

Chondrus Crispus. Carrageen Moss.

Irish moss is collected on the west coasts; when fresh it is purplish, by drying it becomes yellow and crisp; it is inodorous, and tastes mucilaginous; it seems to be of little use except for nutrition, and is used in decoction by boiling ℥ss of it in water or milk Oiij, and straining, or in jelly by increasing the quantity of Carrageen; it is given in chronic pulmonary diseases, dysentery, &c.

ANIMAL MATERIA MEDICA.

Spongia Officinalis, E. *Sponge.*

Is obtained chiefly around the islands of the Grecian Archipelago, by divers; when gathered, it is squeezed and washed, to remove the gelatinous parts, and the dried skeleton of the animal forms sponge; it is used to check hemorrhage, for which it is inferior to shreds of dry lint; and when burned, was prescribed in goitre and scrofula; its effects in these diseases were due to the iodides and bromides contained in it. *Dose.*—ʒj to iij, in electuary; rarely used.

HIRUDO MEDICINALIS, D. L. *The Leech.*

Belongs to the annulated animals; its body consists of 90 or 100 soft rings, tapering at the ends, where disks or suckers are placed; in front is the triradiate mouth containing three jaws, each with two rows of fine teeth; its eyes are ten dark spots arranged in a crescent; its digestive canal consists of a stomach with about eleven cells connected by narrow apertures, a large and small intestine, and the anus opening in the dorsum of the last ring; they are both male and female, but require the contact of two individuals for impregnation, and deposit ova in a cocoon, from which the young escape when of considerable size. There are two varieties, the *green leech,* known by its olive belly, and dark green back marked with six long red stripes; and the *speckled leech* which has a yellowish green belly with black spots, and six reddish stripes, spotted with black on its back; they should be kept in soft water in unglazed earthen vessels, and the water changed every four days in summer, or once a month during winter.

A large number applied at once will produce all the effects of general blood-letting, and are used in many acute diseases alone or in addition to the lancet; they also enable us to keep up a general drain of blood from an inflamed part by employing them in relays, placing a few on the spot, and as they drop off, encouraging the bleeding with stupes until it nearly ceases, when a few more leeches will renew it; leeches also have the advantage of acting locally, and may be used on many parts which cupping cannot reach, as the ear, face, hemorrhoids, to fractures, &c. In applying them to children, they ought to be placed over some bone, for it is often necessary to use pressure in checking the bleeding, as the unrestrained hemorrhage from a single leech bite has proved fatal to infants; in general it is easily stopped by dry lint and pressure, or matico, or cauterizing with the nitrate of silver; if these fail, the orifice should be seized with a tenaculum and a fine ligature put round it.

CANTHARIS VESICATORIA, D. L. E. *Blistering Fly.*

This insect belongs to the *Coleoptera* or beetles; it is six to ten lines long, has two golden green wing covers or elytræ, covering two thin wings, with six feet, and a large head, having black antennæ; it abounds in the south of Europe on the ash, lilac, and other trees; its life is said not to last beyond eight or ten days, and while living they exhale a fetid odour. Cantharides are collected in the morning and evening by persons with their hands and face covered, who shake them from the trees into a cloth, plunge them in hot vinegar and dry them for sale; the insects should be kept in bottles, with a little acetic acid or camphor, as they are liable to be destroyed by mites. They contain fat oils, uric and other acids, salts, and a white crystalline substance cantharidine, which vesicates strongly; it is procured by evaporating an alcoholic tincture, and is insoluble in acetic acid.

ADULTERATIONS.—Euphorbium is said to be often added to its powder; it is difficult to detect.

EFFECTS.—Large doses inflame the bowels, causing vomiting, purging like dysentery, tenderness over the abdomen, lumbar pain, frequent desire to pass urine, with hæmaturia and painful priapism, and death from delirium, convulsions, and coma, or by gangrene of the intestines or genital organs; a female has died after taking gr. xxiv of the powder, and f℥j of the tincture has proved fatal to a boy aged seventeen years. In small doses as gr. j or ij, cantharides are sometimes used as a diuretic in dropsy, but their action is uncertain; they have been given in paralysis of the bladder, and may occasionally do some good in gleet, and Rayer has found them of service in scaly eruptions; they have been celebrated as an aphrodisiac, yet perhaps never act so, unless in dangerous doses, and then indirectly, by exciting the urinary organs.

Externally they are more employed, as local irritants; and may be applied so as to produce either erythema, vesication, or purulent discharge. Erythema is caused by using liniments with cantharides, or flying blisters, as they are termed, for short periods, the latter are followed by redness, increased vascularity, and capillary action, and are used to stimulate the circulation in congestive affections of the lungs during typhus fever, and suffocative catarrh. After four to eight hours, a blister vesicates, usually without pain; if the cuticle is not removed, the serum escapes or is absorbed, and the part heals in two or three days; they thus act as counter-irritants, and slight derivatives, and are used generally in the treatment of disease after the acute symptoms are subdued or have become chronic; attention to this point is the more essential as they are often directed too soon, and cause a great deal of injury especially in chest affections; for bronchitis, their proper place seems to be that stage where stimulating expectorants do good, and in pleurisy they only seem useful after all active inflammation has subsided, in aiding the re-absorption of effusion; for phthysis when limited, and not far advanced, the repeated application of small blisters often relieves local bronchitis, and at least protracts the softening of tubercle; in cerebral affections, as apoplexy and hydrocephalus, it is usual after other treatment to cover the head with a blister as a routine practice, and it seems reasonable to suppose that it is often applied too soon, before inflammatory action is sufficiently checked. The third use of blisters is to cause purulent discharge; this is produced by removing the cuticle, and dressing the surface with irritating substances, as savin or cantharides ointment, or Albespeyre's plasters; they thus act like issues, and are used in treating various chronic diseases as amaurosis, and many cerebral affections, chronic synovitis, &c. To young children, blisters ought not to be applied for above two or three hours, and a piece of thin paper is often placed between the plaster and skin; when the blister is removed, a poultice or mild dressing may be put on, and vesication soon appears; their protracted use may cause fatal sloughing; in some they produce stranguary, which is relieved by employing demulcents.

Acetum Cantharidis, D. L. E. *Vinegar of Flies.*

Preparation.—D. E. Strong acetic acid f℥iv, acetic acid of commerce, dens. 1044, f℥xvj (pyroligneous acid f℥xv, E.), Spanish flies ℥iv (℥iij, E.); macerate for fourteen days, strain through flannel, and filter. (E. adds euphorbium in coarse powder ℥ss, and macerates for seven days.)

L. Cantharides powder ℥ij, acetic acid Oj; macerate for eight days, and strain.

Applied by a sponge as a rapid blister, it acts within fifteen minutes, apparently in great part from the acid, for cantharidine is in general not near so speedy in its effects.

Tinctura Cantharidis, D. L. E. *Tincture of Flies.*

Preparation.—D. L. Cantharides in coarse powder ℥ss, proof spirit Oij; macerate for fourteen days, strain, and filter.

E. Cantharides powder ʒiv, proof spirit Oiij; macerate for seven days, and filter; it is better made by forming the cantharides into a pulp with spirit, for twelve hours, and percolating.

Dose.—Gtt x gradually increased to fʒj, sufficiently diluted; and used externally in liniments. The E. tincture is weaker than D. and L.

Unguentum Cantharidis, D. L. *Unguentum Infusi Cantharidis*, E. *Ointment of Cantharides.*

Preparation.—D. White wax ℥iij, spermaceti ℥j; melt in liniment of Spanish flies f℥viij, with gentle heat, and stir till cool.

L. Cantharides in powder ℥j, water f℥iv, boil to half, and strain; mix resinous cerate ℥iv, with the strained liquid, and evaporate to a proper consistence.

E. Cantharides powder ℥j, boiling water f℥v, infuse for a night, squeeze strongly and filter the liquid; to this add axunge ℥ij, and boil until the water is dispersed; add wax ℥j, resin ℥j, melt, add Venice turpentine ℥ij, and mix.

Applied to blisters and issues, to promote their discharge.

Ceratum Cantharidis, L. *Unguentum Cantharidis*, E. *Cantharides Cerate.*

Preparation.—Spermaceti cerate ℥vj (resinous ointment ℥vij, E.); soften by heat, and add cantharides in powder ℥j.

Used like the ointment, but stronger.

Linimentum Cantharidis, D. *Cantharides Liniment.*

Preparation.—Spanish flies in fine powder ℥iij, olive oil f℥xij; digest for three hours in a steam or water bath and strain through flannel; press the residue, and strain the oil thus got; mix both products.

It may be employed as a stimulating liniment; and is used in making the ointment.

Emplastrum Cantharidis, D. L. E. *Blistering Plaster.*

Preparation.—D. Yellow wax, lard, resin, of each ℥iv; melt, add Spanish flies in powder ℥vj; mix, and stir until cooled.

L. Wax plaster ℔iss, lard ℔ss; melt, and add while concreting, cantharides powder ℔j.

E. Resin, bees wax, suet, of each ℥ij; melt, remove from the fire, and add cantharides powder ℥ij, and stir them briskly while cooling.

Blisters should be spread without heat, and in making this plaster the flies should be fresh, for being animal they are liable to decay and deteriorate by keeping.

Emplastrum Cantharidis Compositum, E. *Compound Blistering Plaster.*

Preparation.—Wax ℥j, Burgundy pitch ℥iij; melt, add Venice turpentine ℥ivss, and while hot add cantharides ℥iij, verdigris ℥ss, white mustard seeds ʒij, black pepper ʒij; all finely powdered and mixed together.

This complicated mixture is supposed to be an infallible blister.

Emplastrum Calefaciens, D. *Warm Plaster.*

Preparation.—Plaster of Spanish flies ℔ss, Burgundy pitch ℔vss; melt with a steam or water heat, and stir constantly until cooled.

COCCUS CACTI, D. L. E. *Cochineal.*

This insect is a native of Mexico, and now introduced into Algeria, it feeds on the nopal plant (*opuntia coccinellifera*) which is cultivated for the purpose, on these the female insects are placed, and never quit the spot where they lay many thousand eggs, then die, and the dead mother forms a shield for the eggs, from which the young issue when hatched; the male has wings, the females constitute cochineal, and are collected thrice yearly; when dried, they appear like small, wrinkled, oblong grains, flattened on one side, and in commerce are distinguished as silver, or black cochineal from their colour. They are inodorous, taste bitterish, and tinge the saliva of a deep red; cochineal is used for a colouring matter, and to prepare carmine; popularly it is employed with carbonate of potash for hooping cough, its medical effects are doubtful.

Tinctura Cocci Cacti, D. *Tincture of Cochineal.*

Preparation.—Cochineal in fine powder ℥ij, proof spirit Oj; macerate for fourteen days, express, and filter.

A few drops may be added to mixtures for colouring.

MEL, D. L. E. *Honey.*

Is formed in the nectaries of plants, sucked by the working bee into its honey bag, where it is slightly changed, and then disgorged and stored up in the comb for use. It consists of a crystalline sugar like that of grapes, and an uncrystallizable one resembling treacle, flavouring, colouring matter, gum, and often acid, if kept too long ; its flavour depends on the plants whence it is procured ; it is occasionally adulterated with starch or flour, which may be detected by iodine producing a blue colour with it. Honey is used in medicine for its sweetness, and is also slightly laxative.

Mel Depuratum, D. *Purified Honey.*—Is obtained by melting fine honey in a water bath, and straining it whilst hot through flannel.

Wax is secreted by the abdominal glands of the bee, it was formerly considered to be modified pollen from plants; a vegetable wax is also obtained abroad, and used for similar purposes. The wax is procured by melting the empty comb in water to separate any impurities, and on cooling it solidifies ; it is yellow, of a peculiar odour, dens. ·26 ; white wax is got by forming melted wax into thin ribbons, and bleaching it, after which it is remelted and cast into flat circular cakes, these are generally adulterated with spermaceti ; it is considered a simple substance consisting of $C_{20}H_{20}O$, and melts at 155°. Wax is used only as a base for ointments.

Emplastrum Ceræ, L. *Emplastrum Simplex,* E. *Wax Plaster.*

Preparation.—L. Wax ℔iij, suet ℔iij, resin ℔j ; melt, and strain.

E. Wax ℥iij, suet ℥ij, resin ℥ij ; melt, and stir while cooling.

Used to prepare other plasters.

Unguentum Ceræ Albæ, D. *Unguentum Simplex,* E. *Ceratum,* L.
Simple Cerate.

Preparation.—D. White wax ℔j, prepared lard ℔iv ; melt, and stir till cool.

L. Wax ℥iv ; melt, and add olive oil f℥iv ; mix.

E. White wax three parts ; melt, and add olive oil six parts ; stir until cool.

Used for dressing blisters, &c., and as a base by D. for preparing other ointments.

Linimentum Simplex, E. *Simple Liniment.*

Preparation.—Olive oil four parts, white wax one part ; melt, and stir until cool.

A softer ointment than the last ; used similarly.

ICTHYOCOLLA. *Isinglass.*

Is valuable as a pure form of gelatine ; it is got from the swimming bladder of fish, chiefly from sturgeons, although many other large fish yield a similar substance; the best description is imported from the Caspian sea, and the rivers of Russia; it is also brought from Hudson's Bay, Brazil, and India, and cut into fine shreds for sale; when pure it is transparent and colourless, it forms a solution with hot water, which becomes a tremulous jelly on cooling, and is used as a mild food for invalids, but its greatest employment is to clear wines; it produces in these, insoluble flocculent compounds which precipitate all the turbid matters.

Gelatine is much used as a substitute for isinglass, and sold in packets cut into coarser shreds, or in thin cakes termed French gelatine; it is got from the cuttings of hides, or by dissolving the earthy matter from bones with acids, and boiling the residue; common glue is but an inferior kind of it. By confectioners, parchment clippings are much used as a source of gelatine, and yield when washed and boiled, a good clear jelly.

OLEUM MORRHUÆ, D. *Cod Liver Oil.*

Procured by allowing the livers of the cod fish to putrify, and collecting their oil as it runs out, the product is dark coloured and highly disagreeable; a finer kind may be got by placing the fresh livers in a wooden vessel, passing steam into this, to coagulate the albumen and burst the oil cells, then removing and filtering the oil. Three varieties are known, termed pale, yellow, and red, from their colour; this may depend in some degree on the fish whence it is obtained, for ling, dorse, &c., yield an oil resembling that of the cod; but it is more influenced by the freshness of the livers and the mode of preparing them, and any of the dark oils may be made paler by filtering through animal charcoal. It contains according to Jongh, a peculiar substance, termed gaduine, with oleine, margarine, biliary matter, salts, with phosphorus, iodine, and bromine in small quantity.

ADULTERATIONS.—Various fish oils have been substituted for it, and vegetable oils are occasionally added to it; there is no means yet known of detecting them.

USES.—It was employed sixty years ago for chronic rheumatism, and lately has become extensively used in various affections, as rickets, old cutaneous eruptions, scrofulous affections, and especially phthysis; its continued exhibition produces in most persons decided increase in weight, which has been attributed to the phosphorus or iodine in it, but the explanation of Dr. Bennett seems preferable, founded on the discovery of Ascherson, that when oil and albumen meet, the latter coagulates around the oil globules, producing those elementary granules of which cells are formed, thus affording nutriment in a concentrated and abundant condition to the body, and Dr. Chambers has lately shewn that when the weight rapidly increases, it is not so much flesh and bone as fat that produces the difference. The strong smelling and rancid oils should not be used for they contain rotting animal substances, and are injurious ; besides, the disgust they cause, prevent its continued employment ; when given during phthysis, congestions and pneumonic attacks seem liable to occur, they require further investigation, and perhaps are connected with too rapid production of fibrinous products in the blood. If as stated, the oil acts by being nutritive, it can be of little use rubbed externally.

DOSE.—f℥ss thrice in the day gradually increased to f℥j or more. Dr. Copland recommends the livers to be boiled in the stomach of the fish, and eaten warm with salt.

CETACEUM. *Spermaceti.*

It is found mixed with oil in a large excavation in the upper jaw of the sperm whale (*Physeter macrocephalus*) anterior to and distinct from the brain ; this oily matter is boiled and strained, on cooling it separates into spermaceti and whale oil, the latter is removed and the spermaceti purified by remelting it with a weak solution of potash. It forms a white pearly crystalline mass, nearly tasteless, free from odour, of dens. 9·4, insoluble in water, and melting at 120° ; it is easily powdered by the addition of a little spirit of wine, and consists of margaric and oleic acids combined with ethal, a peculiar, white, crystalline base. It was formerly given in emulsion for diarrhœa, but is now used only for forming ointments.

Ceratum Cetacei, L. *Ceratum Simplex,* E. *Spermaceti Cerate.*

Preparation.—L. Spermaceti ℥ij, white wax ℥viij, olive oil Oij ; melt, and stir briskly until cool.

E. Olive oil six parts ; gently heat, and add bleached wax three parts, spermaceti one part ; melt, and stir as it cools.

Used to dress ulcers ; it acts by preventing evaporation, and confining the exudation, which is the natural dressing for a sore.

Unguentum Cetacei, D. L. *Spermaceti Ointment.*

Preparation.—D. Spermaceti ℔j, white wax ℔ss, prepared lard ℔iij ; melt, and stir until cold.

L. Spermaceti ʒvj, white wax ʒij, olive oil f℥iij ; melt, and stir as it cools.

Softer than the cerate, and used similarly.

Cornu, L. E. *Hart's Horn.*

The antlers of the hart, or male stag, were used for distilling spirit of hartshorn, which is now obtained by diluting water of ammonia; they are also employed in making antimonial powder, for which purpose they are burned and powdered; but bones answer just as well, and are usually substituted; hartshorn consists of gelatine 27·, phosphate of lime 57·1, and carbonate of lime 1· in 100.

Sevum, L. E. *Suet*, or the fat around the kidneys of sheep; it is melted and strained to remove any membranous tissue, and employed to give consistence to ointments and plasters.

Lac, *Milk*.—Is used for the scammony mixture of E. and its whey, when evaporated and crystallized, affords sugar of milk, which is less sweet than common sugar, and consists of $C_{24}H_{19}O_{19}+5Aq$. it is employed in preparing lactate of iron.

Fel Bovinum, *Ox Gall.*—Is procured by evaporating fresh ox gall to an extract; it should be odourless and slightly sweetish; its composition is fully detailed in all works on chemistry. It is employed as a tonic in dyspepsia, and as a substitute for the biliary secretion when deficient, acting as a mild aperient; fresh gall has the property of rendering writing ink very liquid, and fullers use it for removing grease from cloth.

Adeps Suillus, D. *Adeps*, L. *Axungia*, E. *Lard.*

Hogs lard melts from 78° to 88°; it contains 38 parts of stearine and margarine, with 62 of oleine, in 100 parts, by exposure to the air it becomes rancid from the oleine oxidizing; it is used in ointments, and should not be employed in medicine when thus altered.

Adeps Suillus Præparatus, D. *Prepared Lard.*

Preparation.—Melt commercial lard with twice its weight of boiling water, stirring constantly; let it cool, and remove the lard.

MOSCHUS, D. L. E. *Musk.*

The musk deer, (*Moschus moschiferus*) inhabits the mountains of central Asia; it is about three feet long, its haunches are more elevated than the shoulders, it has no horns, and long canine teeth project from the upper jaw, its fur is deep iron-grey coloured; it is a timid animal, and is caught either in pits or by being shot. The male secretes musk, in an oval, hairy sac, having an orifice just anterior to the prepuce; this sac is flat and smooth where it is in contact with the abdomen, convex beneath and covered with stiff hairs, an inch and a half broad, and two or two and a half long; it contains ʒj to iij of dry musk; Chinese musk is imported in boxes holding about twenty-five pods, its odour is finer than that from Siberia; grain musk is reddish brown, unctuous, has a powerful persistent perfume and a bitter taste; it consists of fatty matter, with the peculiar odorous principle which has not been isolated.

ADULTERATIONS.—Are frequent from its high price; false pods are made in China from the musk deer skin, and filled with a mixture of musk, and perhaps blood; they are known by wanting the oval aperture surrounded with hairs circularly arranged, and the absence of any remains of the penis which is always found in genuine pods; in powder it may have turf mould mixed with it.

USES.—It stimulates the nervous and vascular systems, acting most on nervous constitutions, and Cullen thought it a powerful antispasmodic; it is used in hysteria, erysipelas, low fevers with delirium, subsultus, or hiccup, and Trousseau states that it is aphrodisiac.

DOSE.—Gr. v to ℈j in bolus or emulsion.

Mistura Moschi, L. *Musk Mixture.*

Preparation.—Musk ʒiij, sugar ʒiij; mix, add gum arabic powdered ʒiij, and gradually pour in rose water Oj.

Dose.—f℥j to ij. f℥j contains gr. ix of musk.

CASTOREUM, D. L. E. *Castor.*

The substance termed castor, is obtained from the beaver (*Castor fiber*) which is found in the north of Europe and in America; they are considered by some to be distinct species, from the former burrowing and the latter building their dwellings, both are distinguished by their broad scaly tails from other Rodentia. Castor sacs are found in the male and female, they are seen only on removing the skin; in the male, the anus, prepuce, and two oil sacs all open into a common external hollow, and the castor sacs into the preputial canal; in the female their arrangement is less known. Two varieties are described, the Russian which is rare and expensive, and the American which is usually imported with the sacs adhering together like two testes; they should be filled with an orange resinous looking secretion, having a strong disagreeable odour and a bitter taste. Castor was formerly esteemed as an antispasmodic, but is rarely used now; it may be employed in the same affections as assafœtida.

DOSE.—ʒss to ij.

Tinctura Castorei, L. E. *Tincture of Castor.*

Preparation.—Bruised castor ℥iiss, rectified spirit Oij; macerate for fourteen days, and strain; (percolate or digest, like tincture of cassia, E.)

Much too weak for use. *Dose.*—fʒss to fʒvj, sufficiently diluted.

Tinctura Castorei Ammoniata, E. *Ammoniated Tincture of Castor.*

Preparation.—Bruised castor ℥ijss, fragments of assafœtida ʒx, spirit of ammonia Oij; digest for seven days, press, and filter. *Dose.*—ʒj to ij.

OMISSION.

Mistura Ferri Aromatica, D. *Aromatic Iron Mixture.*

Preparation.—Crown or pale bark in powder ℥j, calumba in coarse powder ʒiij, cloves bruised ʒij, filings of iron separated by a magnet ℥ss; digest for three days in a covered vessel, with as much peppermint water as will give f℥xij when filtered, and then add compound tincture of cardamoms fʒiij, tincture of orange peel fʒiij, and mix.

Termed Heberden's ink from its colour, which is produced by the action of tannin, contained in the vegetable materials, upon the iron; it is a favourite mode of exhibiting this substance in combination with tonics. *Dose.*—f℥ss to f℥ij, twice or thrice daily.

THE END.

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